INSTALLATION AND OPERATION MANUAL

Envoy™ Communications Gateway

141-00014, Rev 03

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Important Information

Read this First

- **Follow the instructions in this manual. These instructions are key to the installation and maintenance of the Enphase Envoy Communications Gateway (Envoy™).**
- **To ensure the safe installation and operation of the Envoy, note the following safety symbols that appear throughout this document to indicate dangerous conditions and important safety instructions.**

WARNING! This indicates a situation where failure to follow instructions may be a safety hazard or cause equipment malfunction. Use extreme caution and follow instructions carefully.

NOTE: This indicates information that is very important for optimal system operation. Follow instructions closely.

Safety Instructions

- Perform all electrical installations in accordance with all local electrical standards.
- Do not attempt to repair the Envoy; it contains no user-serviceable parts. Tampering with or opening the Envoy will void the warranty. If the Envoy fails, please contact Enphase Customer Support for assistance.
- Before installing or using the Envoy, please read all instructions and cautionary markings in the technical description and on the Envoy.

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The Enphase Envoy Communications Gateway

The Envoy is an integral component of the Enphase Energy Microinverter system. It operates between the Enphase Microinverters and the Enphase Enlighten™ web-based monitoring and analysis software. The Envoy functions as a gateway and monitors the microinverters that are connected to the PV modules. The Envoy collects energy and performance data from the microinverters over on-site AC power lines. It then forwards that data to Enlighten, via the Internet, for statistical reporting.

The three key elements of an Enphase system are the:

- Enphase Microinverter
- Enphase Envoy Communications Gateway
- Enphase Enlighten™ web-based monitoring and analysis software

This integrated system maximises energy harvest, increases system reliability, and simplifies design, installation and management. The following diagram shows the Envoy in the system.

1 Enphase Microinverters
- are installed beneath each solar module
- maximize energy harvest
- send AC power over AC wiring to the AC mains
- also send performance data via the AC wiring

2 Envoy Communications Gateway
- plugs into an AC outlet
- collects information via the AC wiring
- transmits data through a standard broadband router to the Internet
- collects information and transmits it to Enlighten in 5-minute intervals

3 Enphase Enlighten Monitoring
- provides monitoring and analysis
- allows performance data to be viewed from any web browser

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Other Elements in the Enphase System

The Enphase Microinverter is a fully integrated device that converts the DC output of the PV module into grid-compliant AC power. In addition to performing the DC to AC conversion, it maximises the PV modules' energy production by using a sophisticated Maximum Power Point Tracking (MPPT) algorithm. This integrated system maximises energy harvest, increases system reliability, and simplifies design, installation and management.

The Enphase Enlighten web-based monitoring and analysis software analyzes the per-module data collected by each communicating microinverter. Enlighten automatically detects any shortfall in energy production, identifies possible causes, and suggests solutions. Enlighten constantly monitors every Enphase Microinverter connected to the Envoy and is essential for monitoring and troubleshooting.

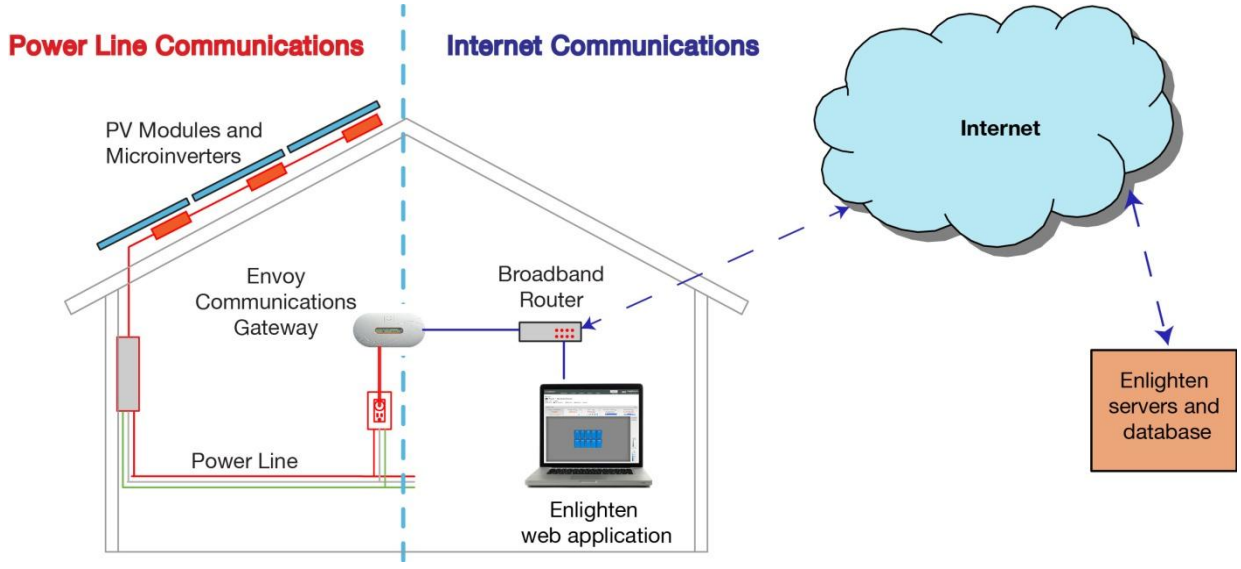
How the Envoy Communications Gateway Works

Installation and operation of the Envoy require no specialised equipment or unique computer or networking expertise. To the Local Area Network (LAN), the Envoy is just another host on the network, much like a personal computer. The Envoy simply connects to the on-site router for communications with the Enphase Enlighten monitoring and analysis website. The Envoy communicates with the individual microinverters using the existing power lines in the residence or business.

As part of the commissioning process, installers must use the Envoy to configure the microinverters with an appropriate grid profile setting. Otherwise, the microinverters will not begin producing power.

After the Envoy is installed and completes its initial scan, it maintains an internal database of all known Enphase Microinverters at the site it manages. At regular intervals, the Envoy polls each microinverter for its energy data. Using the site's broadband router, the Envoy then forwards that information to Enlighten. The Envoy also reports any error conditions that affect it or the microinverters. You can view both energy data and error conditions in Enlighten.

The Envoy incorporates power line and Internet communications functions. As shown in the diagram, one side of the Envoy communicates with the microinverters through power lines at the site. The other side of the Envoy communicates with the Internet using a standard Ethernet/network cable plugged into your broadband router.



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Envoy Installation

Planning and Preparation

Review the following preinstallation checks before you install the Envoy.

Preinstallation Checks

Before installing the Envoy, make sure that the site meets the following minimum requirements:

- Standard AC outlet is available
- Laptop or other computer is available for set up

If you plan to use the Enlighten web-based monitoring and analysis software, additional requirements are:

- Always-on broadband Internet connection
- Broadband router with spare Ethernet port
- Up-to-date web browser to view Enlighten. Supported browsers are Internet Explorer 8 or higher, Firefox 3.6 or higher, Chrome 5 or higher, and Safari 4 or higher. Enlighten requires Adobe Flash Player 10 or higher.

Check the Envoy shipping box for the following items:

- Envoy Communications Gateway
- Ethernet cable
- AC power cord
- Power line communication bridges (included with some models)
- *Envoy Communications Gateway Quick Install Guide*

If you plan to wall-mount the Envoy, you need two #8 (4.166 mm diameter) screws and a screwdriver.

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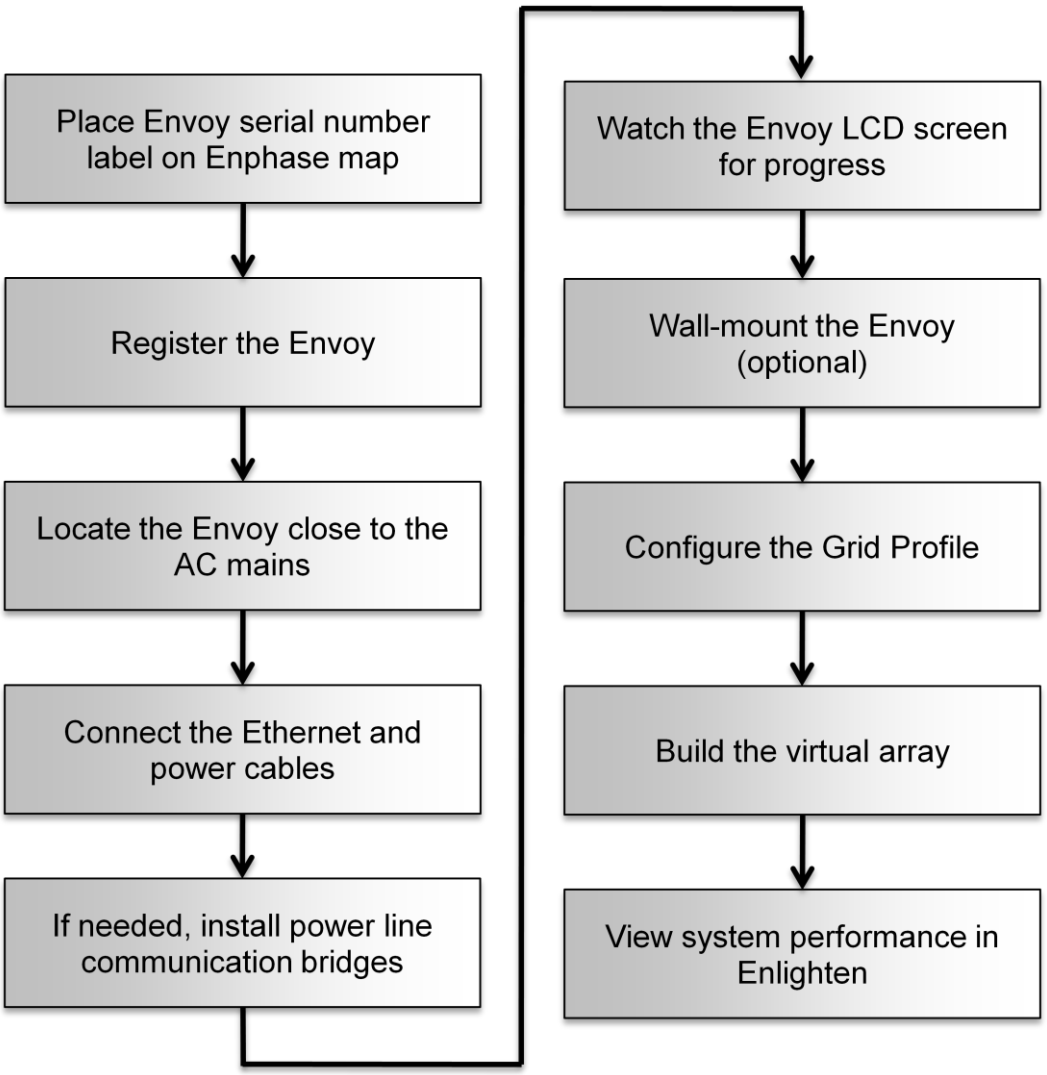
Installation Flow


Place Envoy serial number label on Enphase map
Register the Envoy
Locate the Envoy close to the AC mains
Connect the Ethernet and power cables
If needed, install power line communication bridges
Watch the Envoy LCD screen for progress
Wall-mount the Envoy (optional)
Configure the Grid Profile
Build the virtual array
View system performance in Enlighten

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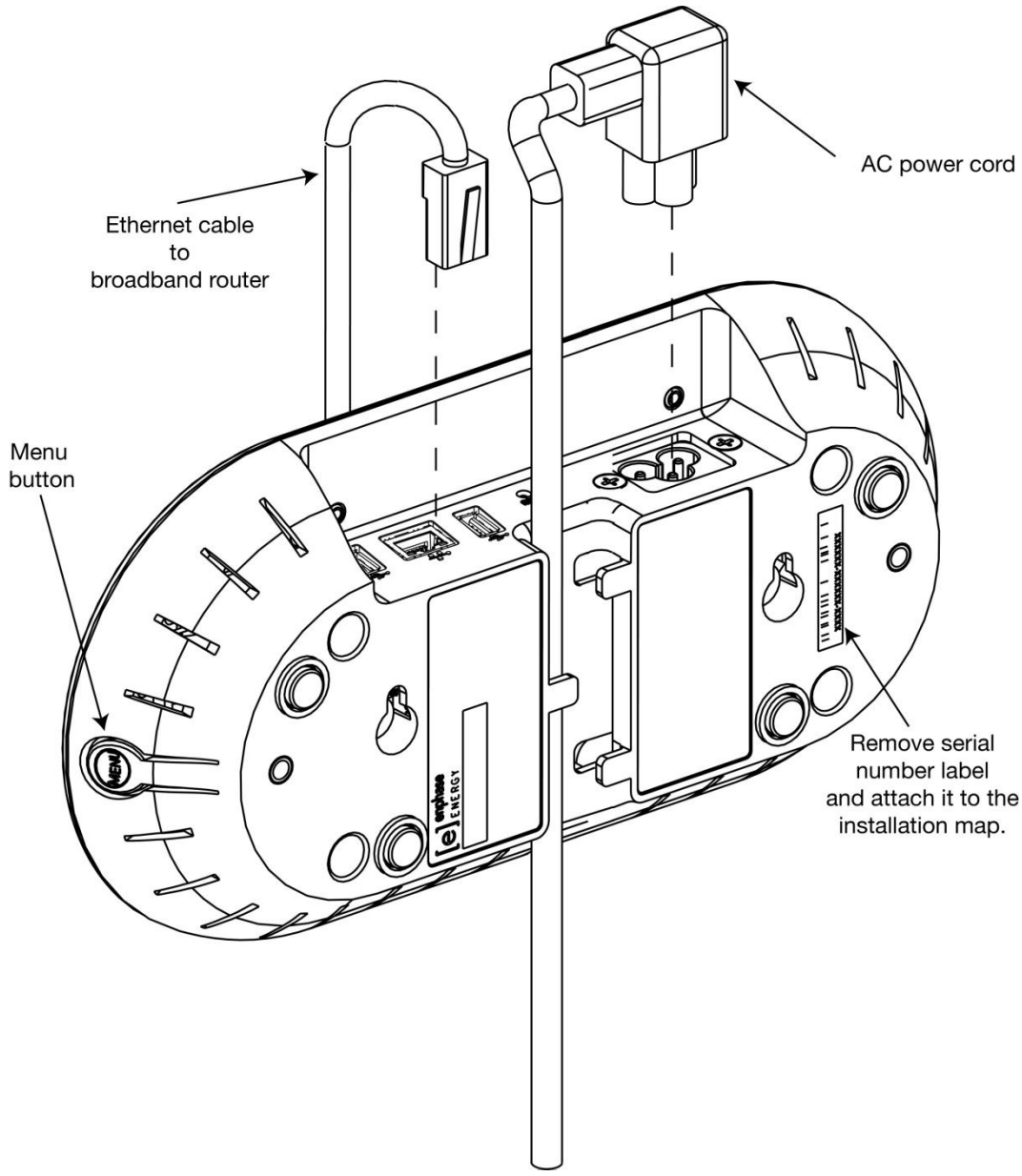
Install the Envoy

To install the Envoy, perform the following steps while referring to the following diagram.

BEST PRACTICE: When powered up and connected for the first time, the Envoy may retrieve an automatic upgrade from Enphase. Because this upgrade may take up to 15 minutes, connect the Envoy first at the site (connect to both AC power and the broadband router) so that it performs the upgrade well before the solar module installation is complete.

WARNING! Do not remove power from the Envoy if the LCD displays: **"Upgrading. . . Do Not Unplug."**



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1. Add Serial Number Label to Map

a. Remove the Envoy's removable serial number label as shown in the diagram.

b. Attach the serial number label to the microinverter installation map, or make note of it for registration in the next step.

2. Register the Envoy

Register the Envoy at the beginning of the PV installation.

a. Use your previously issued username and password to log in to in Enlighten. If you haven't registered, go to www.enphase.com and click **Enlighten Login** to register.

b. If you haven't already started an activation, click **Add a New System** at the Installer Dashboard. If you have already registered the site, find the system under **Installations in Progress**, and register the **Envoy serial number** in the space provided online.

3. Find a Location for the Envoy

Enphase recommends that the Envoy be placed as close to the AC mains as possible. This ensures that the Envoy receives the strongest possible signal from each microinverter. The Envoy must be indoors and can be placed on a table or it can be wall mounted. For wall mounting instructions, see "Wall Mounting" on page 13.

a. Locate an AC outlet **close to the AC mains**.

b. Place the Envoy so that its AC cord can reach this outlet.

4. Connect Ethernet and Power Cables

The Envoy must obtain a DHCP (Dynamic Host Configuration Protocol) IP address and have a path to the Internet. The Envoy will request this IP address from the broadband router during the power-up sequence. Two small green LEDs on the Ethernet port indicate Internet link and activity. One LED will be solid green, and the other will blink every few seconds.

a. Plug the Ethernet cable into the Ethernet port on the Envoy.

b. Plug the other end of the cable into a spare port on the broadband router.

NOTE: Next to the Ethernet port on the Envoy, there are two USB ports. **You cannot use the USB ports for a wired or a wireless Ethernet connection**.

c. Plug the AC power cord into the AC input on the Envoy.

d. Plug the other end of the power cord into a dedicated AC outlet (not a power strip). For best results, the outlet should be near the AC mains.

WARNING! Do not remove power from the Envoy if the LCD displays: **"Upgrading. . . Do Not Unplug."**

WARNING! Do **not** plug the Envoy into a power strip, surge protector, or uninterruptable power supply (UPS). The surge suppression or filtering from a power strip or other protective device can substantially diminish communication performance. Also, if possible, do not plug a power strip into the same outlet that the Envoy is using. The surge suppression or filtering components of a power strip may still interfere with communications if they are near the Envoy.

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5. Connect Power Line Communication Bridges (Optional)

If the Envoy needs to be located away from the router, at a distance where an Ethernet cable is not practical, use power line communication bridges or purchase a wireless Ethernet bridge. Bridges allow the Envoy to communicate with the broadband router without the need for additional Ethernet cabling. To install the bridges:

WARNING! Do not remove power from the Envoy if the LCD displays: **"Upgrading. . . Do Not Unplug."**

a. Plug one of the bridges into the same AC outlet that the Envoy is using.

b. Connect one end of the Ethernet cable to the Ethernet port on the Envoy.

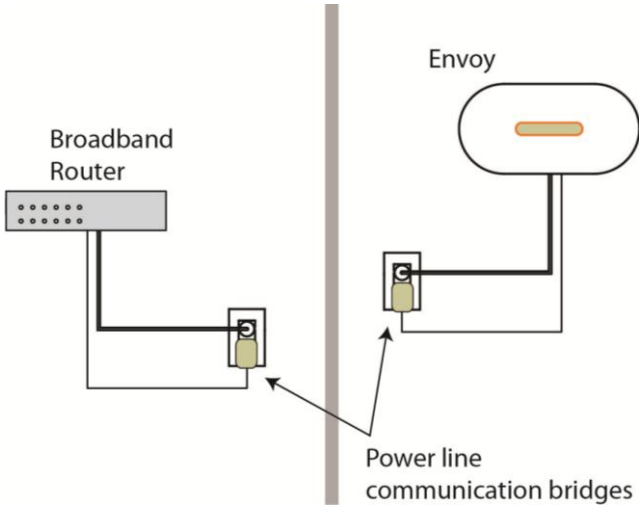
c. Connect the other end of that Ethernet cable to the bridge.

d. Plug the other bridge into an AC outlet near the broadband router.

e. Connect one end of a second Ethernet cable to the second bridge.

f. Connect the other end of the Ethernet cable to the broadband router.

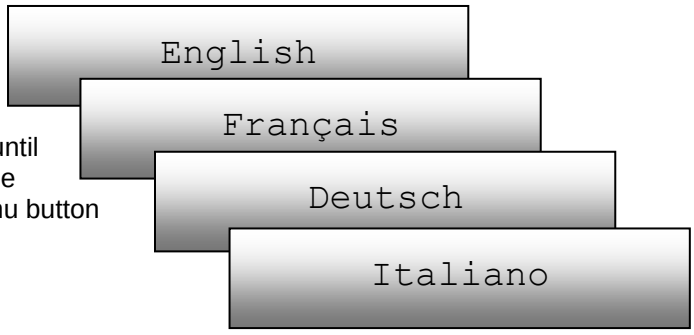
g. Reapply power to the Envoy to force it to refresh its IP address.



6. Select Language

After the Envoy starts up it will request that you set the Language.

- The Envoy LCD panel will scroll through the available language settings, and will continue to scroll until you make a selection. When you see the setting you need, press the Menu button and hold it down for two seconds.



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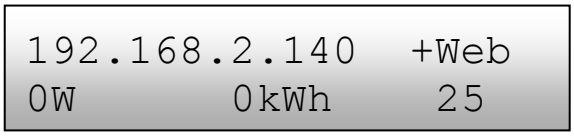
7. Check the Envoy's Progress

After installing your Envoy, you can check its progress:

a. Check the Internet connection. Look for the "+Web" indication. If it still shows "-Web" 15 minutes after connecting to the broadband router, see "Local Area Networking Troubleshooting" on page 30.

NOTE: Power production shows as 0W and 0kWh until the microinverters are discovered and monitoring begins.



b. Check the device count (shown as "**25**" in the illustration). An automatic device scan will begin to detect microinverters.

c. Check the power line communications. The number of "Level" bars on the Envoy LCD Level/Devices screen should be three or more. (The illustration shows three bars.) If there are fewer than three bars, see "Power Line Communication Troubleshooting" on page 29.

d. Soon, the Envoy will display "Priority Scan is Active" on the LCD screen. Check that the Envoy LCD shows a complete device count after about 30 minutes. If it does not, see "Power Line Communication Troubleshooting" on page 29.

e. When all microinverters at the site have been discovered, use the Envoy Device Scan Control menu to stop the device scan:

- Press and hold the Envoy menu button (on the right side of the Envoy).
- Release it when the LCD window displays "Disable Device Scan".

NOTE: For sites with neighbouring Enphase systems, a device scan should not be allowed to run overnight because it may discover neighbouring microinverters when they first power-up in the morning. Always stop the device scan in the afternoon, before leaving the site.

f. Refer to "LCD Screen Display" on page 20 for more information.

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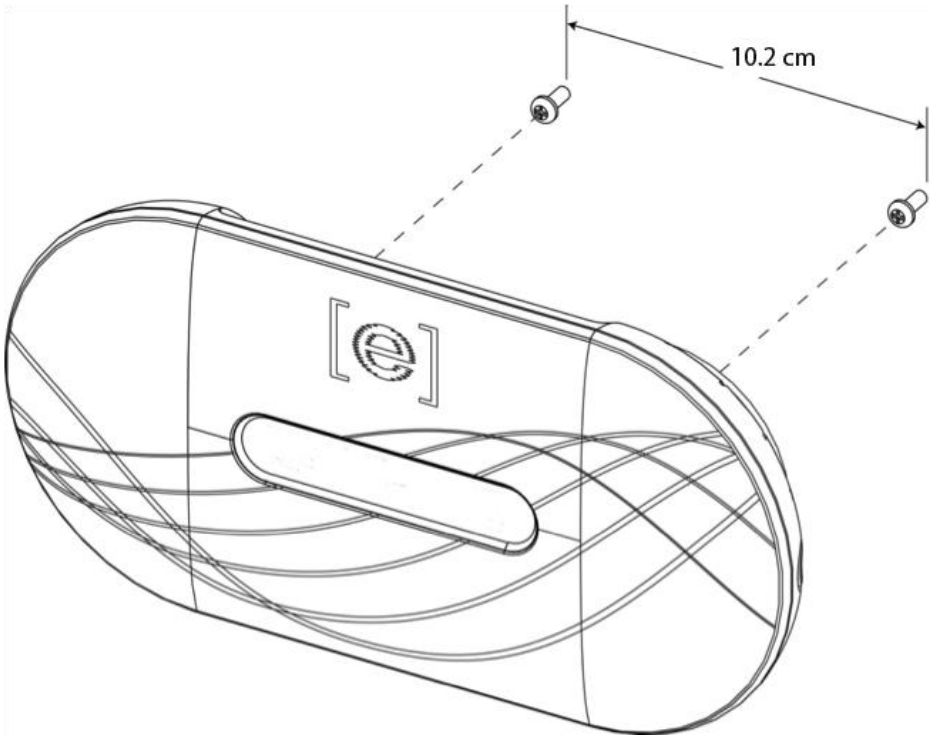
8. Wall Mount the Envoy (Optional)

NOTE: Before mounting the Envoy, it is best to perform a Communications check, as described on page 23, to find the best location for your Envoy.

After you have positioned your Envoy for optimal communications and it is has begun to detect devices, you can mount the Envoy on a wall. To do this:

a. Use two drywall screws or wall anchors (not included) to affix the Envoy to the wall, mounted at the dimensions shown. You will need two #8 (4.17 mm or 0.16 in. diameter); maximum screw head diameter is 8.9mm (0.35 in.).

b. Slide the Envoy onto the mounting screws, aligning the Envoy screw holes with the screws installed in step **a**.



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9. Configure the Grid Profile

The following steps describe how to configure the grid profile. After all of the microinverters at the site are detected, you can apply the grid profile.

Each Grid Profile contains a set of trip points. Trip points are input voltage or frequency values that trigger the microinverters to shut down. These trip points vary from region to region.

If you need to change the grid profile subsequent to this initial procedure, follow the steps in “Change or View the Grid Profile” on page 36

NOTE: Enphase Microinverters will not begin exporting power until the Envoy Communications Gateway is installed and has detected all of the microinverters at the site. In addition, the grid profile must be configured and the Envoy must have propagated these settings to the microinverters.

a. Open the Internet browser application on a computer that is connected to the same local network as the Envoy.

b. In the browser address window, enter the IP address shown in the LCD screen of the Envoy.

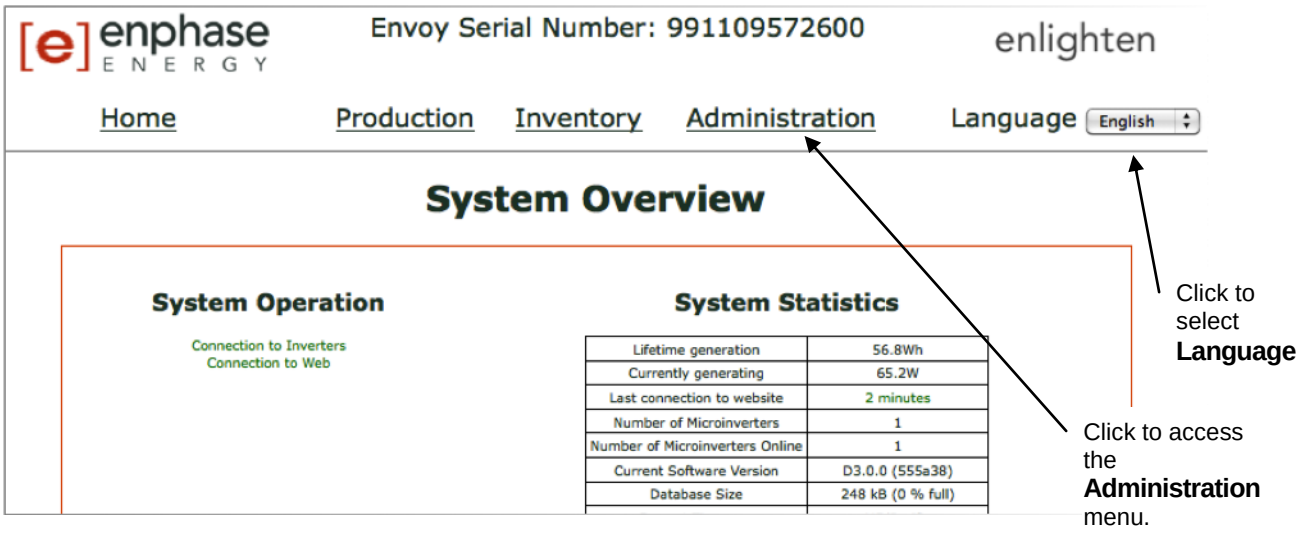
Once the browser has successfully connected with the Envoy, the System Overview screen is displayed in the browser window.

c. From the Language menu, select your preferred language.

d. Click on **Inventory** and verify that all installed microinverters are detected.

e. Click **Administration** to access the Administration menu.
The default log in credentials for the Administration menu are:

Username: admin
Password: admin



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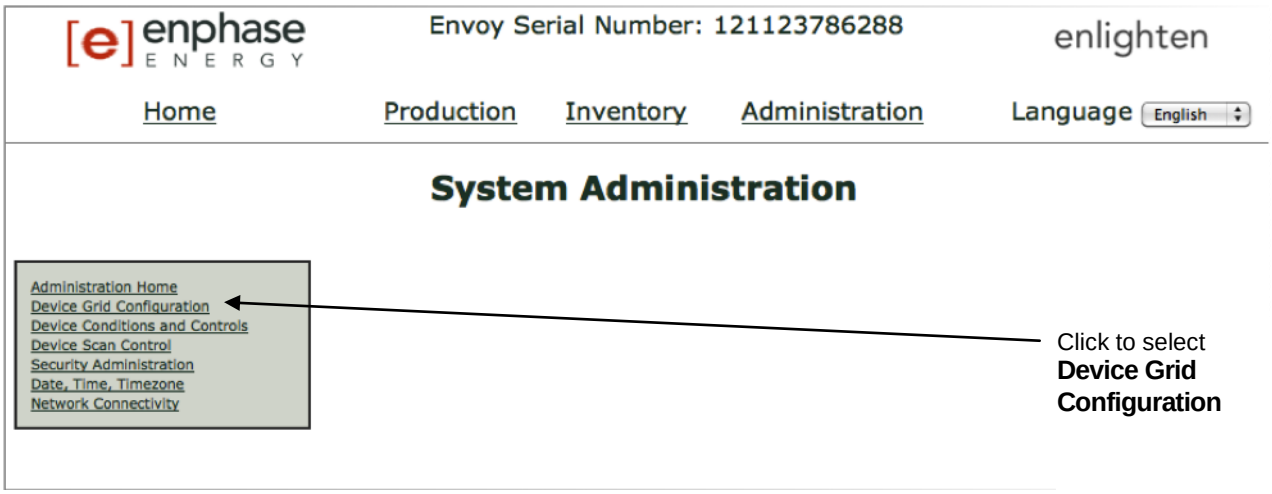
The System Administration screen appears.

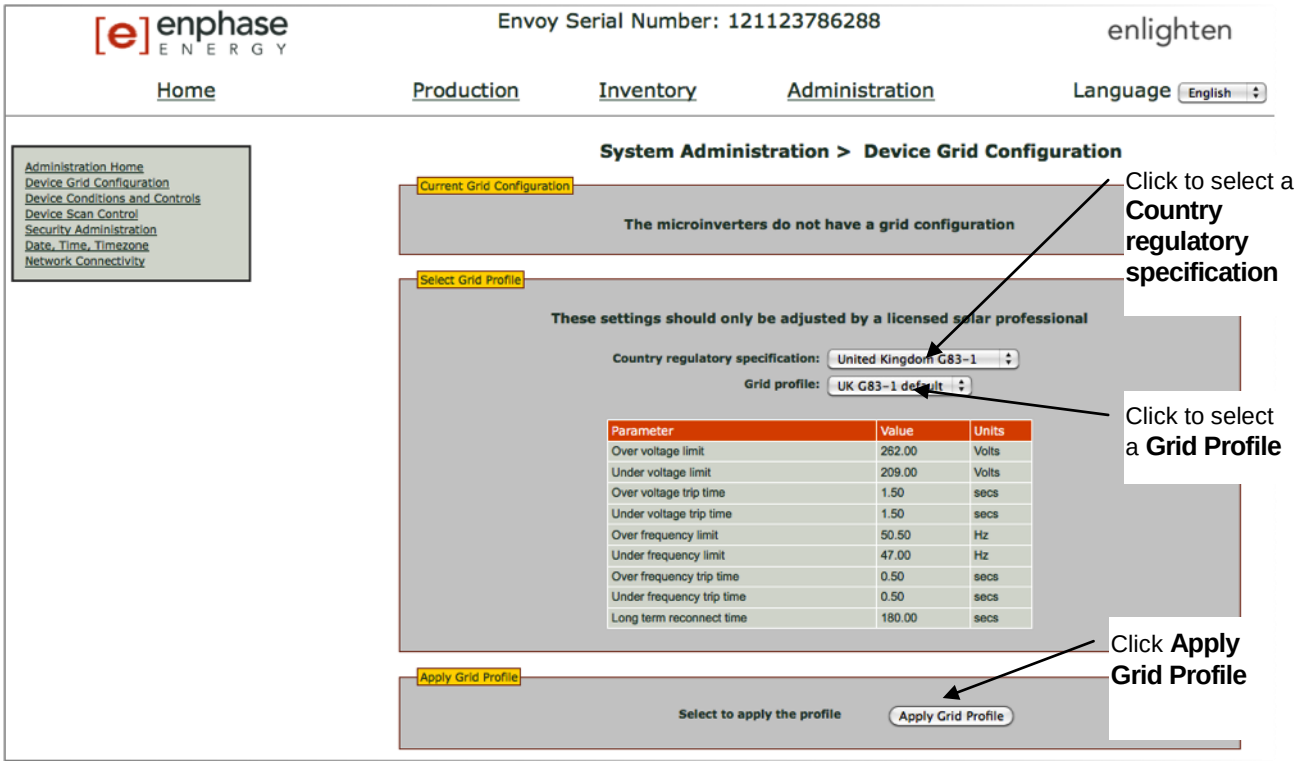
f. From the Admin menu, select **Device Grid Configuration.**



The Grid Configuration screen appears. This screen allows a licensed solar professional to select and apply the appropriate Grid Profile for the site.

g. Select a Country regulatory specification.

h. Select a Grid profile.


[e] enphase ENERGY
Envoy Serial Number: 121123786288
enlighten
Home
Production
Inventory
Administration
Language English
Administration Home
Device Grid Configuration
Device Conditions and Controls
Device Scan Control
Security Administration
Date, Time, Timezone
Network Connectivity
System Administration > Device Grid Configuration
Current Grid Configuration
The microinverters do not have a grid configuration
Select Grid Profile
These settings should only be adjusted by a licensed solar professional
Country regulatory specification: United Kingdom G83-1
Grid profile: UK G83-1 default
Parameter Value Units
Over voltage limit 262.00 Volts
Under voltage limit 209.00 Volts
Over voltage trip time 1.50 secs
Under voltage trip time 1.50 secs
Over frequency limit 50.50 Hz
Under frequency limit 47.00 Hz
Over frequency trip time 0.50 secs
Under frequency trip time 0.50 secs
Long term reconnect time 180.00 secs
Apply Grid Profile
Select to apply the profile
Apply Grid Profile
Click to select a Country regulatory specification
Click to select a Grid Profile
Click Apply Grid Profile

i. Click **Apply Grid Profile**.

The Apply Profile screen appears. This screen allows you to generate a report to confirm that the microinverters have been set with the updated grid profile.

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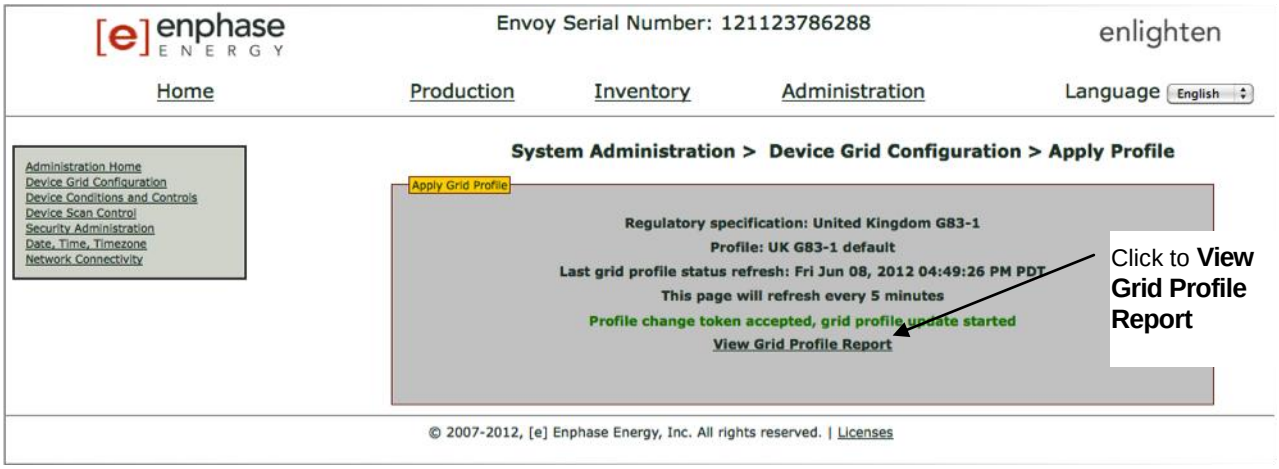
j. Click **View Device Profile Report**.

The Grid Profile Report screen appears.


Envoy Serial Number: 121123786288
enlighten
Home
Production
Inventory
Administration
Language
English
Administration Home
Device Grid Configuration
Device Conditions and Controls
Device Scan Control
Security Administration
Date, Time, Timezone
Network Connectivity
System Administration > Device Grid Configuration > Apply Profile
Apply Grid Profile
Regulatory specification: United Kingdom G83-1
Profile: UK G83-1 default
Last grid profile status refresh: Fri Jun 08, 2012 04:49:26 PM PDT
This page will refresh every 5 minutes
Profile change token accepted, grid profile update started
View Grid Profile Report
Click to View Grid Profile Report
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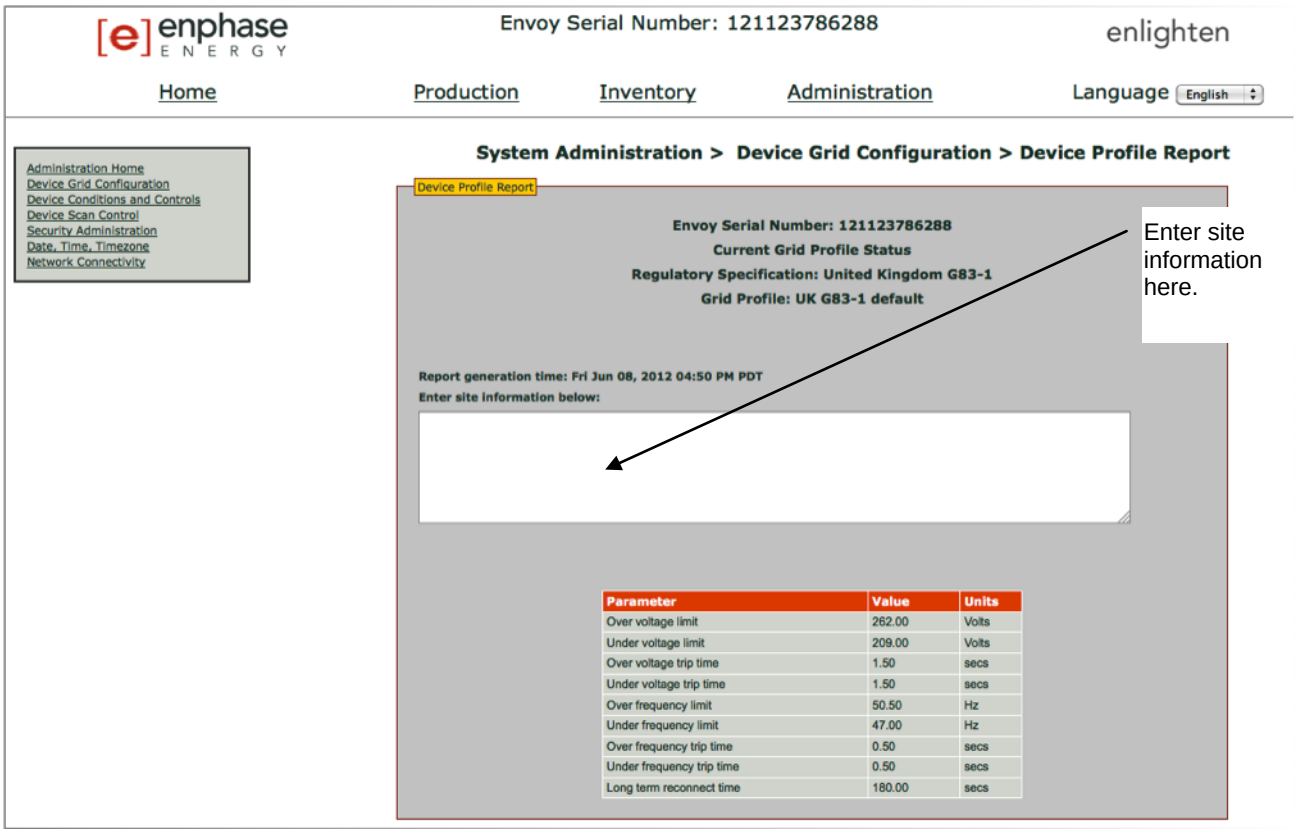
k. Enter the site information in the window provided.



l. Use your browser to send this report to your printer or to save it to a file. After printing or saving the file, you can send it to the local regulatory agency to confirm the grid profile and trip point settings.

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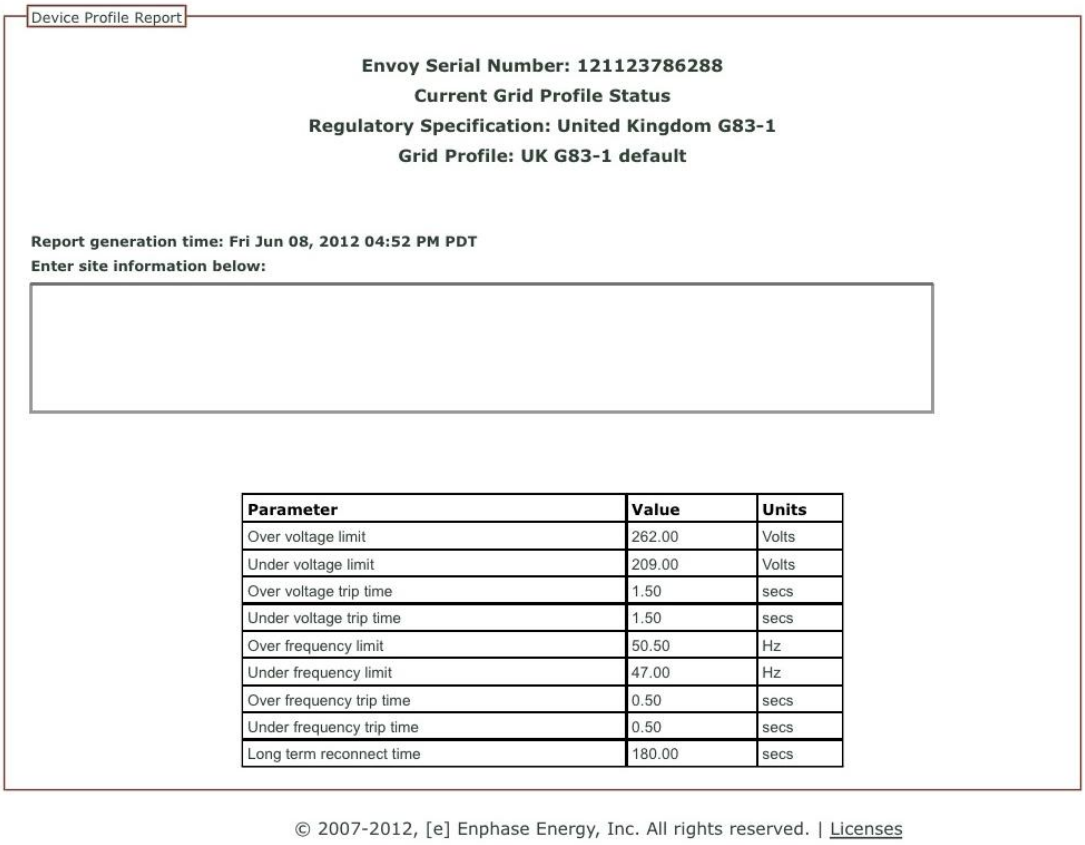
The report will look like the following example.



Device Profile Report

Envoy Serial Number: 121123786288
Current Grid Profile Status
Regulatory Specification: United Kingdom G83-1
Grid Profile: UK G83-1 default

Report generation time: Fri Jun 08, 2012 04:52 PM PDT
Enter site information below:

Parameter	Value	Units
Over voltage limit	262.00	Volts
Under voltage limit	209.00	Volts
Over voltage trip time	1.50	secs
Under voltage trip time	1.50	secs
Over frequency limit	50.50	Hz
Under frequency limit	47.00	Hz
Over frequency trip time	0.50	secs
Under frequency trip time	0.50	secs
Long term reconnect time	180.00	secs

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10. Build the Virtual Array

When the system is energised and the Envoy detects at least one microinverter, the installer can begin to create the virtual array in Enlighten from the installation map they created.

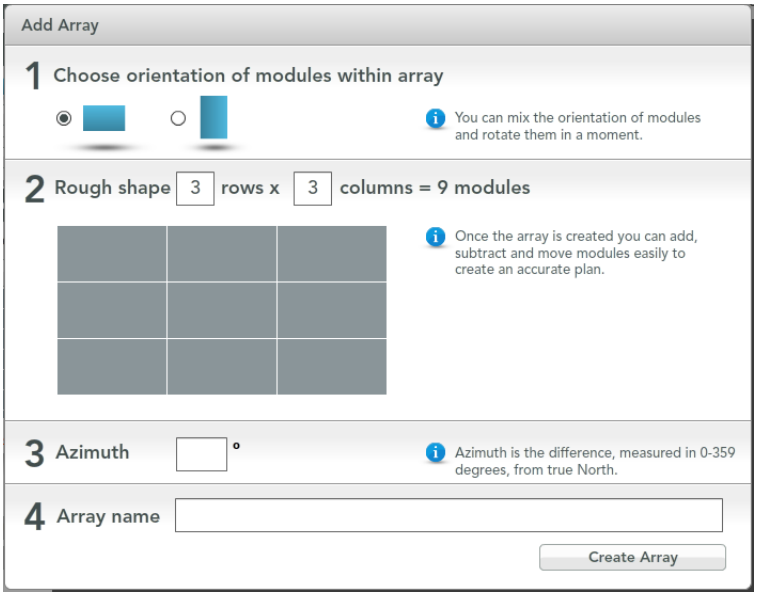
a. Log in to Enlighten.

b. Use Array Builder to create the virtual array in Enlighten.

c. Use your installation map as your reference.

To see the Array Builder demo, go to http://enphase.com/support/videos/.

Once the virtual array is built, Enlighten displays a graphic representation of the PV system. It also shows detailed current and historical performance information.

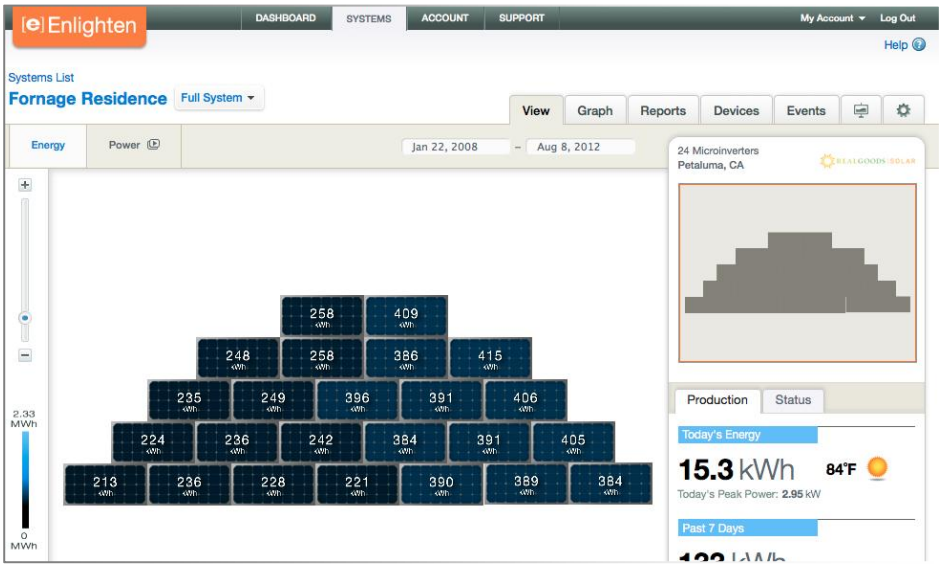

Add Array
1 Choose orientation of modules within array
You can mix the orientation of modules and rotate them in a moment.
2 Rough shape 3 rows x 3 columns = 9 modules
Once the array is created you can add, subtract and move modules easily to create an accurate plan.
3 Azimuth °
Azimuth is the difference, measured in 0-359 degrees, from true North.
4 Array name
Create Array

11. View System Performance in Enlighten

Once the array is built and the system is activated, the installer and the system owner can log in to Enlighten to view site data.

a. If you have not done so already, log in to Enlighten to view system data.

b. Refer to “How the Envoy Works with Enlighten” on page 27 for more information.



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Envoy Operation

First Scan for Microinverters

A newly installed Envoy automatically performs an initial scan to discover all of the microinverters that are installed and powered up at the site. This initial scan continues to search for new microinverters for eight hours from initial start up of the Envoy. This one-time scan is not repeated automatically. During the scan, you will notice some values increasing on the Envoy display.

NOTE: If the Envoy was not factory built with software release 3.2, the initial scan will run for seven days. The initial scan time was reduced from seven days to eight hours with release 3.2. If the Envoy upgrades to release 3.2, after an initial scan has begun, the initial scan duration will still be seven days.

NOTE: If the eight-hour scan expires before installation of microinverters is complete, a new scan must be initiated. The steps for initiating a new device scan are described on page 23 of this manual.

WARNING: Stop the scan once all of the devices are detected (see page 12). For sites with neighbouring Enphase systems, a new device scan should not be allowed to run overnight because it may discover neighbouring microinverters when they first power-up in the morning.

The Envoy identifies each device by its unique serial number. If a microinverter is added or replaced at the site, you must initiate a new scan so that the Envoy can discover the new microinverter. The steps for initiating a new device scan are described on page 23 of this manual.

After the Envoy has detected at least one new device, it will automatically enter Priority Scan mode. The LCD screen will display the following, where “nnnn” represents the number of microinverters (devices) detected.

```
Priority Scan is
Active.   Devs: nnnn
```

When the Envoy does not detect a device during a polling interval (usually 5 minutes), it will exit Priority Scan mode. If, subsequently, the Envoy detects another device, it will return to Priority Scan mode. It will remain in this mode until it again completes an interval where no new devices are detected.

NOTE: While Priority Scan is active, power production, power line communication level, and grid profile information screens continue to display on the Envoy LCD screen.

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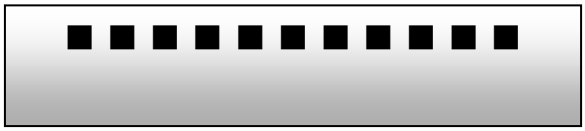
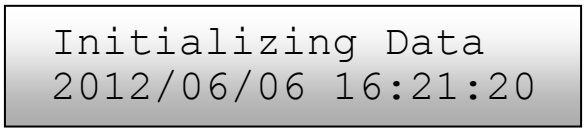
LCD Screen Display at Initial Start Up

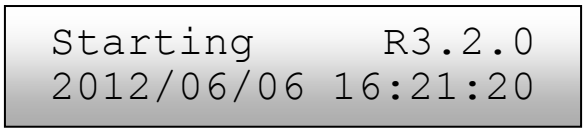
When the Envoy is started up for the first time, it goes through the initial boot sequence. During this initial boot sequence, the Envoy LCD screen display progresses as shown:



Initial Communications Check

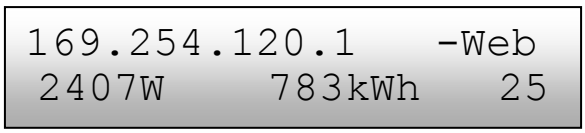
The last two screens in the initial sequence alternate until the Communications Check ends, after 20 minutes. The Envoy normally displays "-Web" for two to three minutes after the first start up. It then sends the first report to Enlighten. When Enlighten responds, the Envoy displays “+Web”.

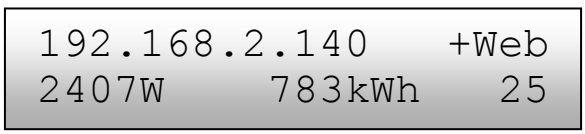




Subsequent Start Up

After a power outage or Envoy shut down, the Envoy is ready to work just five minutes after reapplying power. You will know the Envoy has completed booting and has started normal operation when it displays both an IP address and the “+Web” status indication in the LCD screen. The normal, post installation boot sequence is similar to the initial start up, although the “Initializing Data” screen is not repeated.





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Normal Operation

Once the Envoy completes a scan, it begins or resumes normal operation. At this point, the indicators in the LCD screen show current values for your system. This is the home screen:

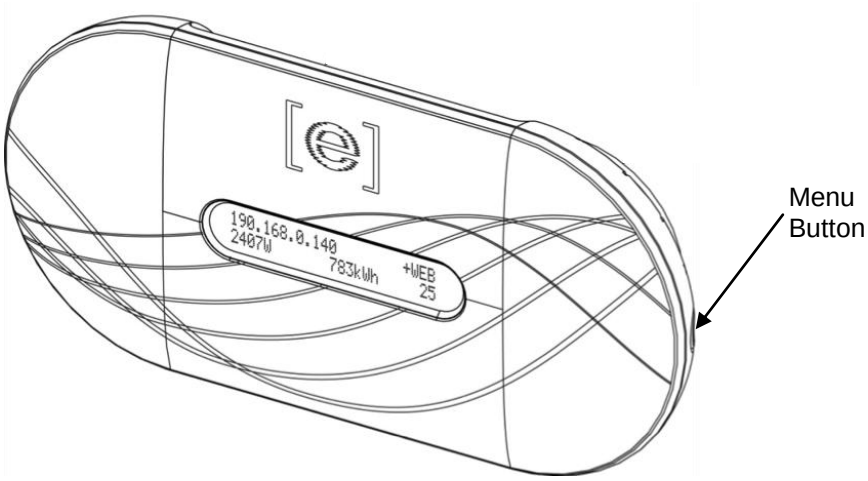
It may be a few minutes before energy data appears or increases on the home screen after starting up the Envoy or initiating a scan. Information shown during normal operation includes:

- Local IP address, for example: **192.168.2.140** (your actual local IP address will be different). The Envoy will attempt to get a dynamically assigned DHCP (Dynamic Host Configuration Protocol) IP address during power up sequence. The Envoy uses the DHCP IP address as a path to the Internet. If 169.254.120.1 is shown, the Envoy has not yet acquired a dynamic IP. Refer to “Troubleshooting” on page 29, if this address continues to display.
- Web connection indication: **+Web.** The web status indicates whether the Envoy is connected to Enlighten.
- Indication of the present power-production, in watts: **(n)W** (where n is a number)
- Indication of the life time kilowatt hours reported to this Envoy: **(n)kWh** (where n is a number)
- Indication of the number of online microinverters producing power and reporting in to the Envoy: **(n)** (where n is a number). The number of microinverters displayed will be zero at night.

After the Envoy establishes an IP address and the web connection, the Envoy periodically contacts an NTP (Network Time Protocol) server so that it can maintain an accurate local time.

Using the Envoy LCD Menu

Use the Envoy Menu button located on the right side of the Envoy to access the Envoy LCD menu.



1. Press and hold this button. After two seconds the Envoy menu appears in the Envoy’s LCD screen.
2. Continue holding the Menu button. Menu items will appear in the following order:

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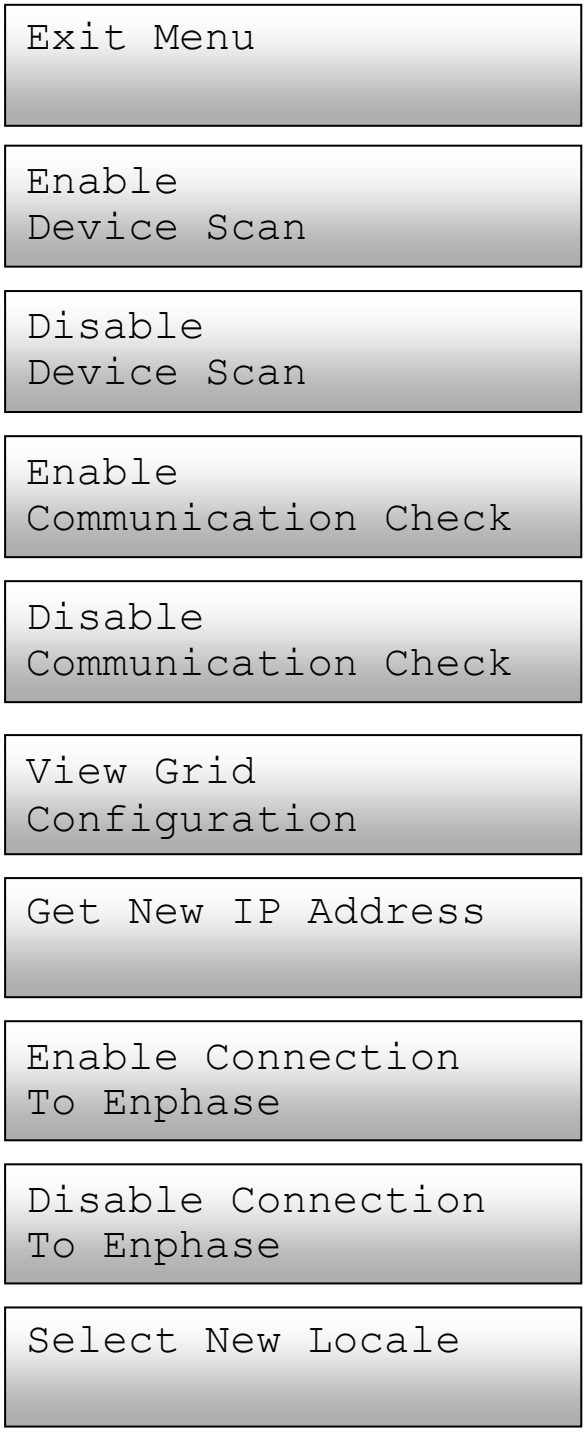
3. To select a menu item, release the Menu button when the desired menu item appears. The menu continues to cycle as long as you are pressing the Menu button. The **Exit Menu** option returns to the normal (default) display, usually the Home screen. See the following sections for detailed procedures.



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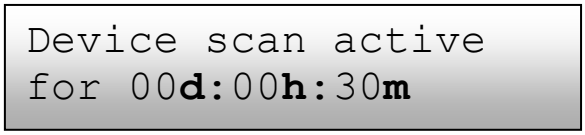
Initiating a Scan for New Microinverters

If you add additional microinverters to an existing system or replace a microinverter, you will need to run a scan to detect the new devices. To initiate a scan after you add new microinverters to an existing Enphase system perform the following steps.

Alternatively, you can initiate a scan through the administration page when connected to the Envoy local interface with a computer or via Enlighten (refer to “Using Enlighten to Check Envoy Status” on page 28).

1. Press and hold the Envoy Menu button. After two seconds the Envoy menu appears.
2. Continue holding the Menu button. When the LCD screen displays “Enable Device Scan”, release the Menu button.

The LCD screen then reads:



The Envoy begins a 30-minute scan (if a longer scan is not already in progress) to identify all of the microinverters deployed at the site.

3. Use your previously issued username and password to check for the new microinverter in Enlighten. If you do not have a link to Enlighten, go to www.enphase.com and click **Enlighten Login**. From here you can register (if not already done) and view data on a per-microinverter basis (and, hence, a per-PV module basis).
4. To disable or cancel a scan, press and hold the Envoy Menu button for two seconds to view the Envoy menu.
5. When the LCD screen displays: “Disable Device Scan”, release the Menu button.

Performing a Communications Check

If you are unsure of where the Envoy should be located for maximum performance, you can install the Envoy in various locations and check signal strength at each location. Normally, a communications check starts automatically after an Envoy restart. Alternatively, you can initiate a communications check with the Envoy Menu button or through the Administration page when connected to the Envoy local interface with a computer. You can also use Enlighten (see “Using Enlighten to Check Envoy Status” on page 28).

NOTE: Device scans and communications checks can only be done during daylight hours when the microinverters are active (that is, powered by the PV modules).

To use the Envoy Menu button to initiate a communications check:

1. Press and hold the Menu button on the right side of the Envoy to bring up the Envoy menu on the LCD screen.

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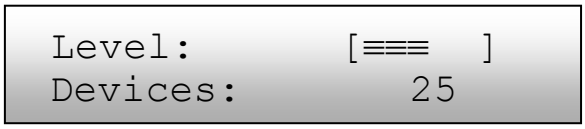
2. When the LCD screen displays “Enable Communication Check”, release the Menu button.

The LCD screen then reads:

The Envoy begins a 20-minute communications check to assess the signal strength between the Envoy and the microinverters detected at the site. Until the Envoy begins detecting microinverters, the display reads:

When the Envoy begins detecting microinverters, the display shows power line communication Level and Device count:



To the right of the word “Level”, you’ll see brackets enclosing zero to five bars. The example above shows three bars.

NOTE: Until microinverters are detected, the Level indicator shows no bars.

Signal strength is acceptable if three to five bars are displayed and all devices are accounted for. One to two bars may not be sufficient for consistent communication.

3. If, after 15 minutes, fewer than three bars are displayed, refer to “Power Line Communication Troubleshooting” on page 29.

The “Devices” counter displays the number of microinverters detected and will increase until all microinverters are detected. Ultimately, the number of microinverters detected should match the number of installed microinverters.

4. After 20 minutes, the communications check stops. To stop the communications check before it times out, press and hold the menu button to activate the Envoy menu. When “Disable Communication Check” is displayed, release the menu button.

Viewing the Grid Configuration

To view the grid configuration (trip points profile) for the site, do the following.

NOTE: You cannot change the grid profile using this menu. To change this profile, and for more information on this feature, see “Change or View the Grid Profile” on page 36.

1. Press and hold the Envoy Menu button. After two seconds the Envoy menu appears.
2. Continue holding the Menu button. When the LCD screen displays **View Grid Configuration**, release the Menu button.

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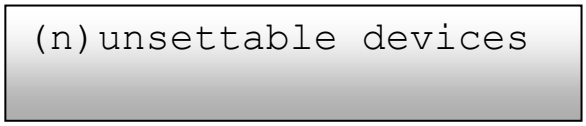
The LCD screen then reads:

If a grid profile **has not** been applied, the following screen is displayed:
This indicates that the microinverters are not yet configured with a grid profile.

3. If needed, configure these settings as described in “Change or View the Grid Profile” on page 36.

If a grid profile **has** been applied, the following screens are displayed. You can press the menu button at any time to exit this process.

Number of microinverters detected.

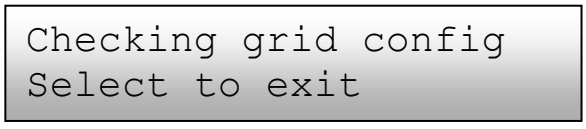


Number of microinverters that **cannot** be set with a grid profile.

Number of microinverters that are set with a grid profile and the name of the specification being used.

Number of microinverters that are in the process of being set and the name of the specification being used.

Number of devices that failed to be set with a grid profile.



Updating grid configuration data.

4. Press the menu button to exit this menu.

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Enabling a Connection to Enphase

The Enable Connection to Enphase menu item creates a secure connection to Enphase allowing Enphase personnel to troubleshoot the system remotely.

To open a connection to Enphase:

1. Press and hold the Envoy Menu button. After two seconds the Envoy menu appears.
2. Continue holding the Menu button. When the LCD screen displays “Enable Connection to Enphase”, release the Menu button.

The LCD screen now reads:

Once the connection is open, the LCD will return to the default display.

Disabling a Connection to Enphase

The Disable Connection to Enphase menu item closes the secure connection to Enphase.

To close a connection to Enphase:

1. Press and hold the Envoy Menu button. After two seconds the Envoy menu appears.
2. Continue holding the Menu button. When the LCD screen displays “Disable Connection to Enphase”, release the Menu button.

The LCD screen now reads:

Once the connection is closed, the LCD will return to the default display.

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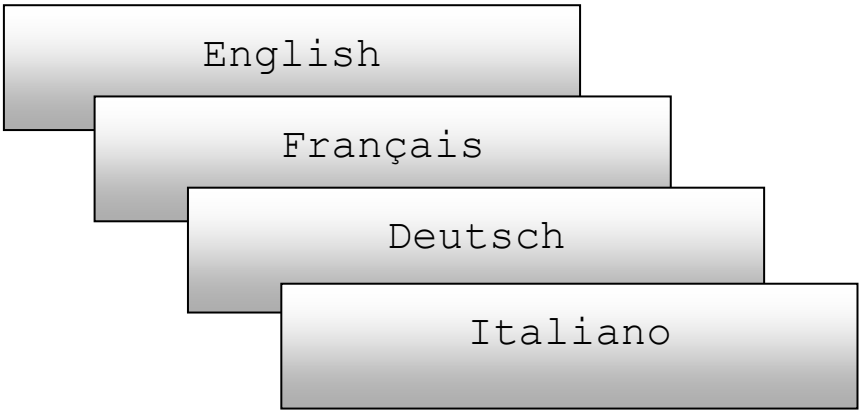
Selecting a New Locale (Change Language Display)

You can set the LCD to display in English, French, Italian, or German. To do this:

1. Press and hold the Envoy Menu button. After two seconds you will enter the Envoy menu.
2. Continue holding the Menu button. When the LCD screen displays “Select New Locale”, release the Menu button.

3. The Envoy LCD panel will scroll through the available locale settings. When you see the setting you need, press the Menu button and hold for two seconds.



How the Envoy Works with Enlighten

The Envoy operates between the Enphase Microinverters and the Enphase Enlighten web-based monitoring software. The Envoy collects energy and performance data from the microinverters and forwards that data to Enlighten, via the Internet, for reporting.

Once you have registered the system and successfully installed the Envoy, Enphase will set up an account for the site owner. You can then use Array Builder, a tool available to installers, to build the virtual array. You will need to use the installation map you created during installation as a reference during this task.

NOTE: To see the Array Builder demo, go to http://enphase.com/support/videos/.

If you do not already have an account, please go to www.enphase.com for more information.

When you complete the registration and installation, Enphase sends account information to the site owner so that they can log in to the Enlighten website and view system performance.

Enlighten provides a wide range of information on system and PV module performance. A graphical representation of the PV array provides “at a glance” information on the status of each PV module. You can also access more detailed information, including current and lifetime performance metrics. You can even access Enlighten on your mobile device and view current performance information wherever you are.

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Networking and Firewall Info

The Envoy communicates with Enlighten by initiating outbound TCP (Transmission Control Protocol) connections to Enphase over HTTPS (Hypertext Transfer Protocol over Secure Socket Layer) (TCP:443). The Envoy uses NTP (Network Time Protocol) (UDP:123) to periodically synchronise time/date with an external pool of NTP servers. You do not need to open any inbound firewall ports for normal operation.

NOTE: The Envoy automatically reports system performance data to Enphase upon connection to the Internet. Please consult the Enphase privacy policy at http://www.enphase.com/privacy/ to learn more about Enphase's use of this data.

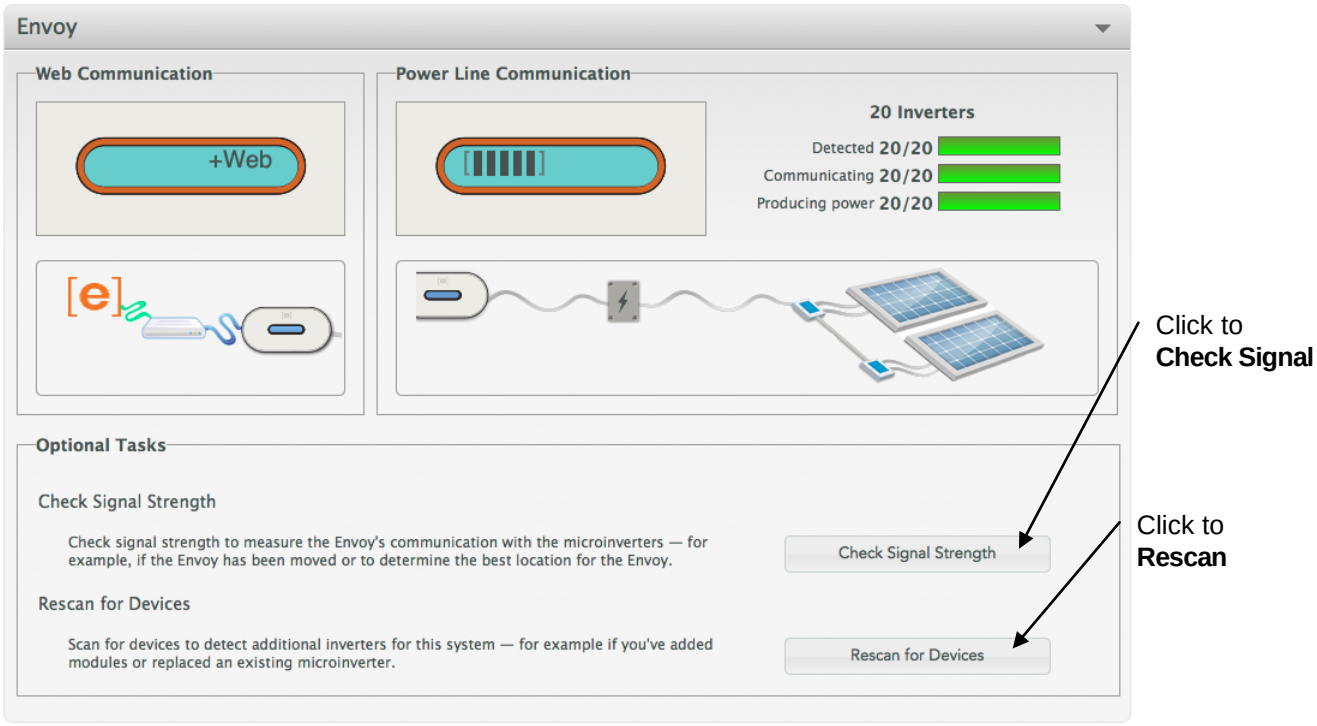
Using Enlighten to Check Envoy Status

To check status of Enphase equipment, do the following:

1. Log on to Enlighten to view the array. Click **Inverters**.

   A list of equipment appears that including the Envoy(s) all of the microinverters that the Envoy has detected. The column on the far right lists the status of each microinverter.

2. To view status information for the Envoy, click the Envoy serial number.


Envoy
Web Communication
+Web
Power Line Communication
20 Inverters
Detected 20/20
Communicating 20/20
Producing power 20/20
Optional Tasks
Check Signal Strength
Check signal strength to measure the Envoy's communication with the microinverters — for example, if the Envoy has been moved or to determine the best location for the Envoy.
Check Signal Strength
Rescan for Devices
Scan for devices to detect additional inverters for this system — for example if you've added modules or replaced an existing microinverter.
Rescan for Devices
Click to Check Signal
Click to Rescan

3. From here you can choose to **Check Signal Strength** or **Rescan for Devices** as needed.

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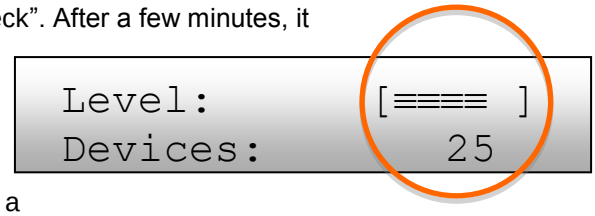
Troubleshooting

The following sections describe possible problems and solutions. For information on system status and event messages, see “Event Messages” on page 43. For more extensive information, refer to *Troubleshooting an Enphase Installation* at http://www.enphase.com/downloads.

Power Line Communication Troubleshooting

At power-up, the Envoy performs a “Communications check”. After a few minutes, it will display a number of bars in the LCD screen. This value, from zero to five, indicates the signal strength of the power line communication between the Envoy and the microinverters.



Any time the Envoy is restarted, it automatically performs a communications check. However, there may be times when you need to manually initiate a check. To do this:

- Press and hold the Envoy menu button. Release it when the LCD window displays **Enable Communication Check**. The check will run for 20 minutes.
- Note the number of bars shown in the Communications check.

Signal strength is acceptable if three to five bars are displayed and all devices are accounted for. One to two bars may not be sufficient for consistent communication. Zero bars means that the Envoy needs to be relocated, or it means that one or more electrical appliances are causing interference. Troubleshoot power line communication issues as described in the following.

Issue: The Microinverter Count is Lower than the Number of Installed Units

This may indicate that the Envoy is not done scanning/discovering the entire array. Alternatively, it may indicate that the Envoy is having difficulty communicating over the power lines. It could also be a result of low light levels and the PV module voltage being too low for the microinverter to power up. To troubleshoot the issue:

- Make sure that the Envoy is plugged directly into the wall and **not** into a power strip or surge protector.
- Relocate your Envoy as close to the electrical service panel (AC mains) as possible. This ensures that the Envoy receives the strongest possible signal from each microinverter.
- Try unplugging any other device that may be sharing the outlet with the Envoy. Or, as an alternative, plug the Envoy into a circuit that supports fewer electronic appliances. Appliances sharing a receptacle with the Envoy may interfere with power line communication.
- If this problem occurs when light levels are low, try again during daylight hours.

Issue: Envoy Displays Fewer than Three Bars

Follow the procedure (previous) for “Issue: The Microinverter Count is Lower than the Number of Installed Units”.

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Issue: Envoy Displays Zero Bars

The following conditions may exist.

Is there a phase imbalance?

- Ask the electrician to measure the conductors and neutral line to verify that the phases are balanced. If the phases are not balanced, electricians must recheck the wiring.

Is the system energised? PV modules power microinverters, PV modules provide power only during daylight hours, and microinverters communicate only when powered.

- Run another scan during daylight hours.
- Check that the circuit breaker(s) for the PV array are in the “ON” position. For the Envoy to communicate with the microinverters, the PV circuit breakers must be in the “ON” position in the electrical AC mains.
- Verify that the PV modules are connected to the microinverters.

The Envoy is plugged into a circuit on the primary AC mains, but the PV circuit breakers are on a downstream subpanel: The primary AC mains is full and doesn’t have additional capacity to add circuit breakers.

- Add a subpanel with a small subset of circuit breakers. In this case, it is best to add an additional 5-Amp circuit breaker and then run an outlet off that subpanel. Plug the Envoy into that AC outlet, so that it can be close to the PV circuit breaker.

Local Area Networking Troubleshooting

To the Local Area Network (LAN), the Envoy is just another host on the network, much like a personal computer. Enphase offers technical support at support@enphaseenergy.com for Envoy issues, but Enphase's Support responsibility does not extend to the premises network or LAN.

Issue: IP Address Problems

If the IP address displayed on the Envoy’s LCD screen is 169.254.120.1, or if the IP address does not match the DHCP subnet on the internal network, this means that the Envoy was unsuccessful in obtaining a DHCP lease from the router.

- Check network connectivity to the router or other DHCP server. You may also wish to contact your Internet Service Provider or refer to your router documentation for help.
- Check that you are using a broadband router and not a switch or a hub. Many hubs and switches cannot provide a DHCP lease and may not allow the Envoy to connect to the web.
- Use the Envoy menu button to “Get New IP Address”, and then allow 30 to 60 seconds for the new IP address to appear on the Envoy LCD screen.
- Two small green LEDs on the Ethernet port indicate Internet link and activity. One LED will be solid green, and the other will blink green every few seconds. If the LEDs are not both on or blinking, try using a new Ethernet (CAT5) cable in place of the existing cable.
- Unplug all units in the chain, applying power again in this order: 1) modem, 2) router, and 3) Envoy. Allow a few minutes for the IP address to be reassigned.

Issue: LCD Screen Displays “-Web”

This means that the Envoy has no connection to the Enlighten website. To troubleshoot the issue:

- Check network connectivity to the router. You may also wish to contact your Internet Service Provider or refer to your router documentation for assistance.
- Unplug all units in the chain, applying power again in this order: 1) modem, 2) router, and 3) Envoy. Allow a few minutes for the IP address to be reassigned.
- Allow a few minutes longer. If the Envoy has recently received a valid IP address, it will likely display “+Web” momentarily.

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Issue: LCD Screen Displays “Envoy Failure +Web or -Web”

This message displays after the Envoy has tried unsuccessfully three times to initialise.

- Unplug the Envoy from the AC outlet and plug it in once again. Leave it in place for at least 15 minutes.
- If it continues to display Envoy Failure or if it never moves beyond the Initialization stage, contact Enphase Customer Support (support@enphaseenergy.com).

Issue: The Envoy has Good Signal Strength but is Too Far from the Router

- In this case, you may need to use power line communication bridges or a wireless Ethernet bridge.

Replacing an Envoy

If problems remain after following the troubleshooting steps above, contact Enphase at support@enphaseenergy.com. If Customer Support authorises an Envoy replacement (RMA), follow the steps below.

1. Disconnect the Ethernet cable and power cord from the old Envoy.
2. When the replacement Envoy arrives, connect it to the Ethernet cable and power cord.
3. Verify that the new Envoy powers up. The Envoy LCD may display "**Upgrading... Do Not Unplug**" for up to 15 minutes. Wait for this to complete before proceeding.
4. Verify that the new Envoy indicates **“+Web**” within 15 minutes. If not, follow the network troubleshooting steps above.
5. Verify that the new Envoy start discovering microinverters within 20 minutes of starting up. If necessary, use the LCD menu (or the Enlighten Envoy page) to start a new device scan during daylight hours. (See Using the Envoy LCD Menu on page 21.)
6. After all microinverters have been discovered, stop the new device scan using the LCD menu. (See Using the Envoy LCD Menu on page 21.)
7. Assess the power line communications by running a Communication Check from the LCD menu (or from the Enlighten Envoy page) during daylight hours. (See Using the Envoy LCD Menu on page 21.) If fewer than three bars are shown, relocate the Envoy for better power line communications.
8. Ship the old Envoy to Enphase using the supplied RMA shipping label.

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Envoy Local Interface

The Envoy relays data to Enlighten, and connection to the Enphase Enlighten web-based monitoring and analysis software requires an Internet connection. However, if there is no broadband router at the installation site, you can communicate directly with the Envoy using the Ethernet port and a personal computer with a web browser.

Connecting to the Envoy through the Site's LAN

The following steps describe how to access the Envoy data through the site's LAN (local area network).

1. Open an Internet browser application on a computer connected to the same LAN as the Envoy.
2. In the browser address window, enter the IP address displayed in the LCD screen of the Envoy.

Once the browser has successfully connected with the Envoy, the home screen is displayed in the browser window.

Directly Connecting to the Envoy without a Broadband Router

The following steps describe how to access the Envoy data through the local connection in the absence of a broadband router.

1. Connect one end of the Ethernet cable supplied with the Envoy to the Ethernet port on the Envoy.
2. Connect the other end of the Ethernet cable to the Ethernet port of the computer.
3. Open an Internet browser application on the computer.
4. In the browser address window, enter the IP address displayed in the LCD screen of the Envoy.

NOTE: If you fail to make a connection at this point, you can manually configure your subnet to 169.254.120.2 and subnet mask to 255.255.0.0. If this does not correct the problem, contact Enphase Customer Support (mailto:support@enphaseenergy.com).

Once the browser has successfully connected with the Envoy, the home screen is displayed in the browser window.

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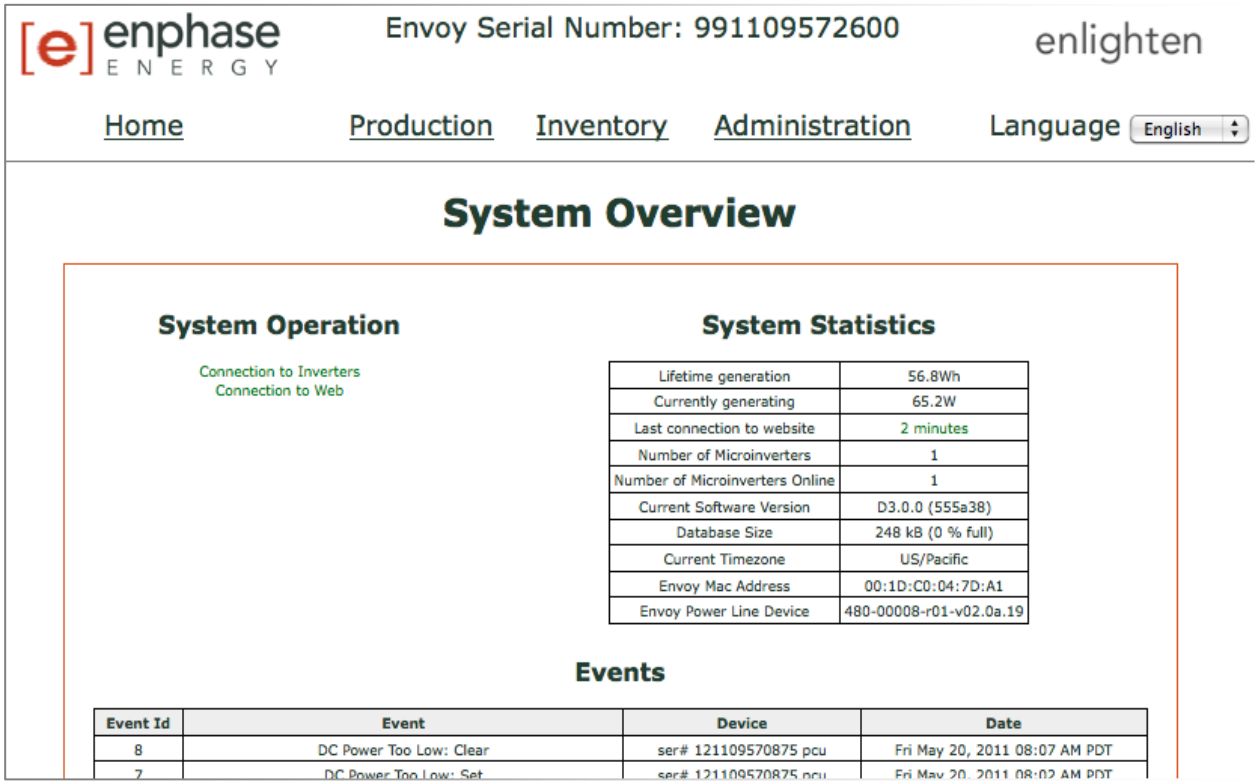
Home Screen

The home screen provides a system overview and shows the current status of the microinverters that have been identified by this Envoy. From this screen, you can access other screens in the interface.



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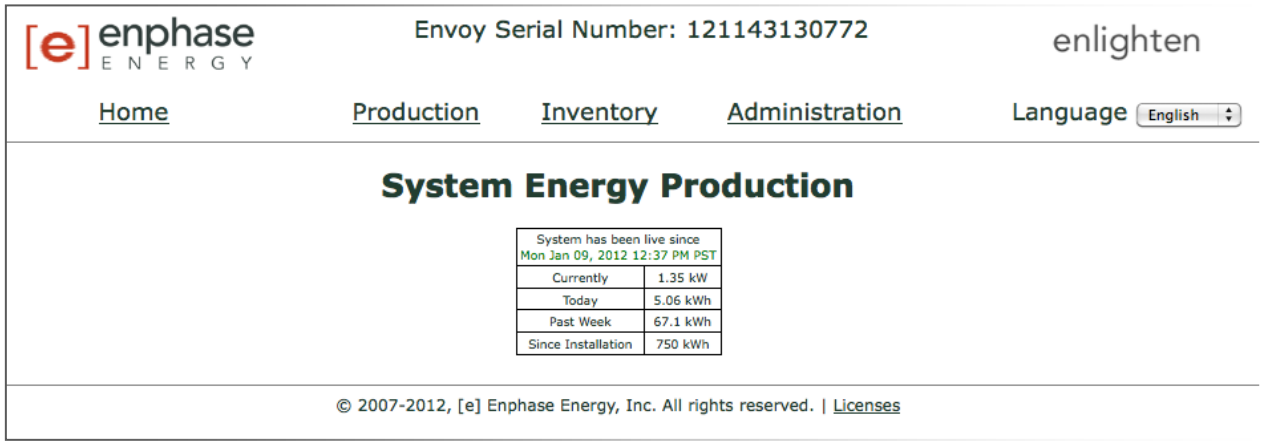
Production Screen

To view system energy harvest statistics for your system, click **Production** from the Envoy home screen to navigate to the production screen.



Inventory Screen

To view a listing of the devices in your system, click **Inventory** from any screen to navigate to the inventory screen.

enphase ENERGY
Envoy Serial Number: 121143130772
enlighten
Home
Production
Inventory
Administration
Language English
System Inventory
New Device Scan Status
Scanning for new devices is inactive.
Device Scan Control
Microinverter
HW Part Num | Installed | HW Serial Num | Device Status | Running Image - Updated | Assembly Part Num | Controller Part Num | Last Report
800-00107-r07 | Tue Feb 28, 2012 10:50 AM PST | 121137056819 | OK | 520-00043-r01-v00.01.00 - Tue Mar 20, 2012 12:26 PM PDT | fff-fffff-rff-vff.ff.ff | 480-00008-r01-v02.0a.19 | Tue Mar 20, 2012 02:00 PM PDT
800-00107-r07 | Tue Feb 28, 2012 10:55 AM PST | 121137056988 | OK | 520-00043-r01-v00.01.00 - Tue Mar 20, 2012 12:26 PM PDT | fff-fffff-rff-vff.ff.ff | 480-00008-r01-v02.0a.19 | Tue Mar 20, 2012 02:00 PM PDT
800-00107-r07 | Tue Feb 28, 2012 10:55 AM PST | 121137057126 | OK | 520-00043-r01-v00.01.00 - Tue Mar 20, 2012 11:52 AM PDT | 880-00017-r09 | 480-00008-r01-v02.0a.19 | Tue Mar 20, 2012 02:00 PM PDT

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Administration Screen

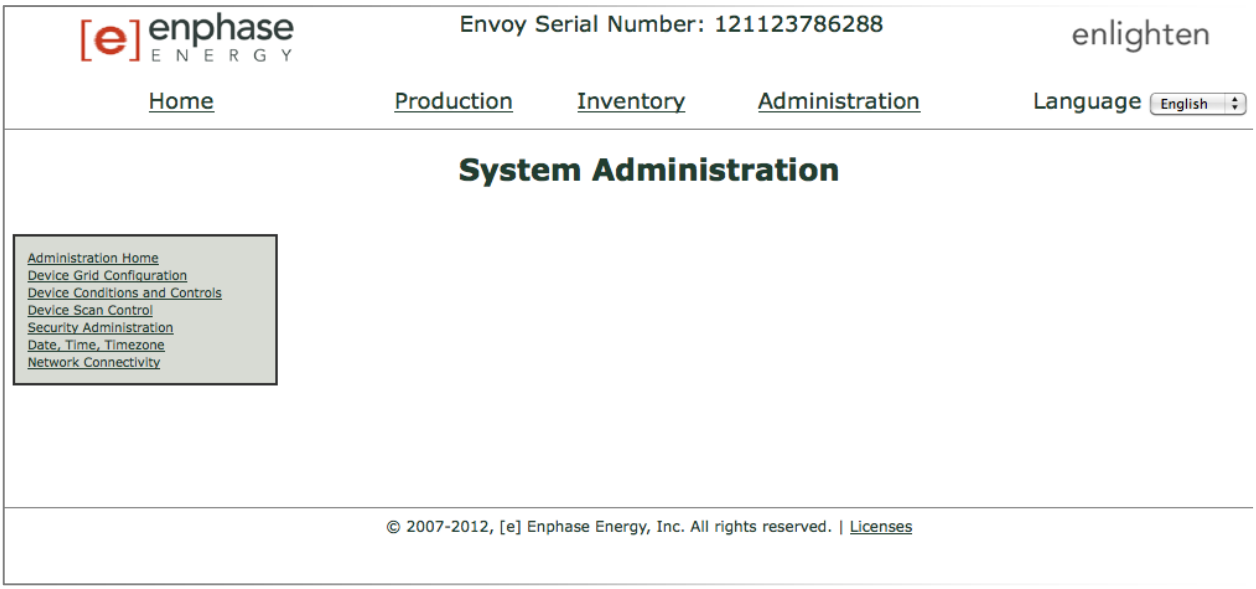
The Administration screen of the Envoy local interface contains several configurable options. Click **Administration** to access this menu.

NOTE: For Envoy performance reasons, Enphase does not recommend giving the Envoy a publicly accessible IP address. However, if you must place the Envoy on a public-facing IP address, Enphase recommends that you change the admin password to disallow unauthorised modification to your Envoy. **(This situation is rare, since consumer-grade routers normally provide the Envoy with an internal network IP address that is not publicly accessible.)**

For reference, your private/internal IP address space will be in the 192.168.x.x, 172.16(-31).x.x, 10.x.x.x or 169.254.x.x range. If you are unsure if your Envoy is on the public Internet, contact your network administrator or Internet Service Provider.

The default login credentials for the Administration menu are:

- Username: **admin**
- Password: **admin**



Administration Screen Tasks

The following sections describe several Administration Screen tasks. Perform these tasks only when needed. Administration tasks include:

- Manage the Grid Profile
- Set Up Device Scan Control
- Set Time Zone
- Other Admin Tasks

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Change or View the Grid Profile

Many Enphase Microinverters have field adjustable voltage and frequency trip points. Trip points are input voltage or frequency values that trigger the microinverters to shut down when the values are exceeded. If local regulations require adjustments to these trip points, the installer can set up the system to use an alternate Grid Profile (set of trip points).

NOTE: Only an authorised installer, following the requirements of the local regulatory authority, is allowed to make Grid Profile adjustments.

NOTE: Grid profile changes are applied only after a microinverter is detected.

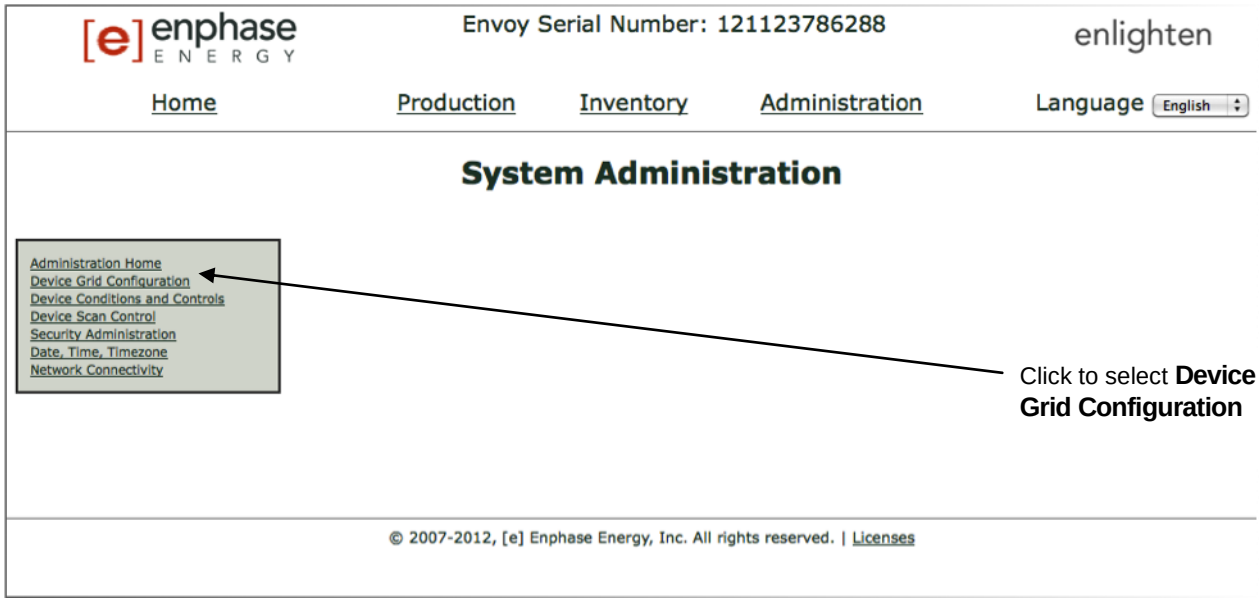
In some regions and in some situations, microinverter trip points must be adjusted to account for high grid voltage or for local conditions. Grid profile management tasks include:

- Adjust system trip points for frequency and voltage if required by local utilities
- Reset trip points to default values
- View or verify current grid profile
- Generate a report for confirmation of site settings to the utility or other authority

To change a grid profile, you need a “Change Token”. Change tokens are issued on a per Envoy serial number basis. Contact Enphase Customer Support for your Grid Profile Change Token as directed on the screen.

1. From the System Overview screen, click on **Inventory** and verify that all installed microinverters are detected.
2. Click **Administration** to access the Administration menu.
   The default log in credentials for the Administration menu are:
   - Username: **admin**
   - Password: **admin**

   The System Administration screen appears.



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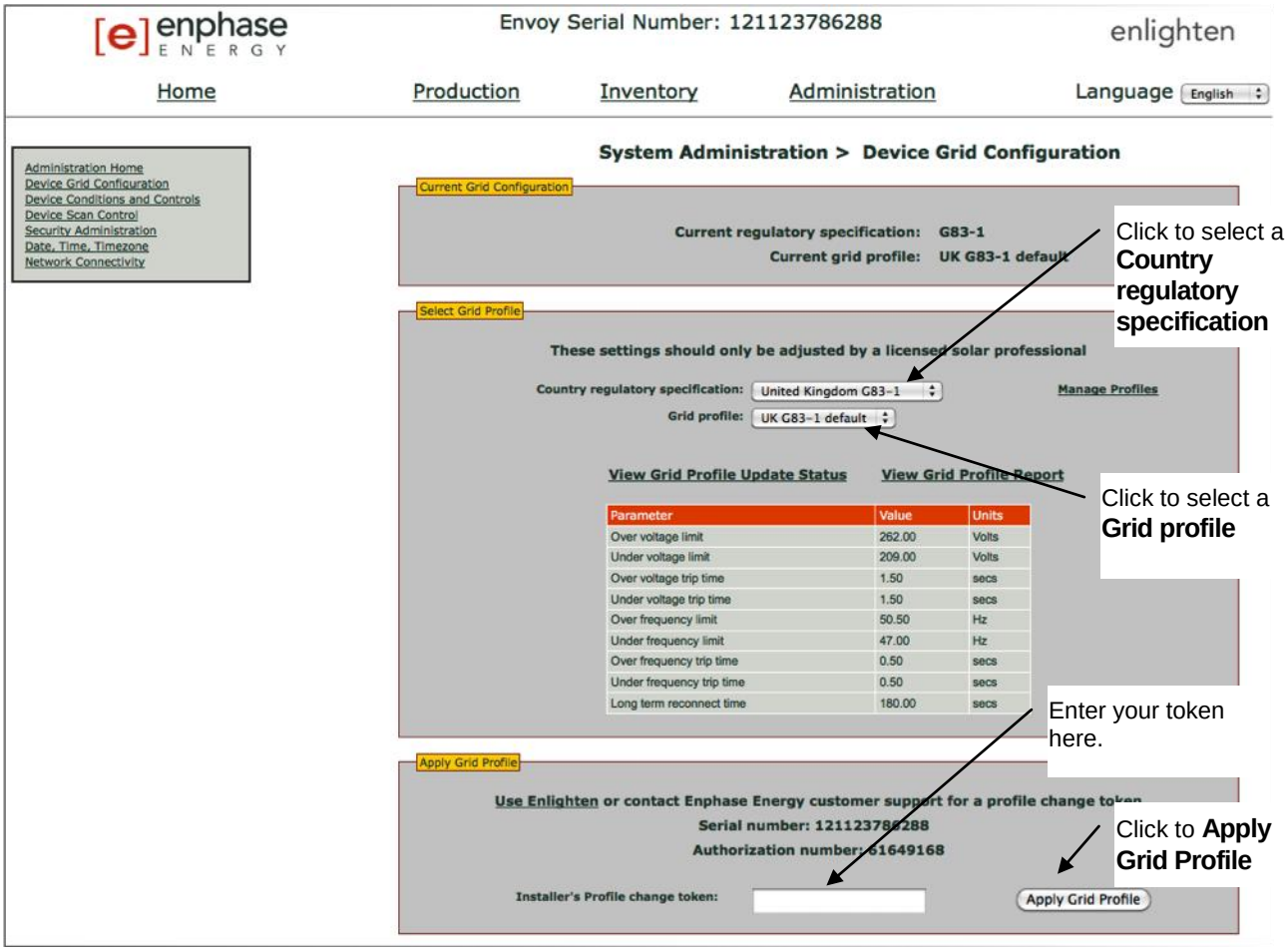
3. From the Admin menu, select **Device Grid Configuration.**

   The Device Grid Configuration screen appears. This screen allows a licensed solar professional to select and apply the appropriate trip points for the solar installation.


enphase ENERGY
Envoy Serial Number: 121123786288
enlighten
Home
Production
Inventory
Administration
Language English
Administration Home
Device Grid Configuration
Device Conditions and Controls
Device Scan Control
Security Administration
Date, Time, Timezone
Network Connectivity
System Administration > Device Grid Configuration
Current Grid Configuration
Current regulatory specification: G83-1
Current grid profile: UK G83-1 default
Select Grid Profile
These settings should only be adjusted by a licensed solar professional
Country regulatory specification: United Kingdom G83-1
Manage Profiles
Grid profile: UK G83-1 default
View Grid Profile Update Status
View Grid Profile Report
Parameter | Value | Units
Over voltage limit | 262.00 | Volts
Under voltage limit | 209.00 | Volts
Over voltage trip time | 1.50 | secs
Under voltage trip time | 1.50 | secs
Over frequency limit | 50.50 | Hz
Under frequency limit | 47.00 | Hz
Over frequency trip time | 0.50 | secs
Under frequency trip time | 0.50 | secs
Long term reconnect time | 180.00 | secs
Apply Grid Profile
Use Enlighten or contact Enphase Energy customer support for a profile change token
Serial number: 121123786288
Authorization number: 61649168
Installer's Profile change token:
Apply Grid Profile
Click to select a Country regulatory specification
Click to select a Grid profile
Enter your token here.
Click to Apply Grid Profile

4. Select a **Country regulatory specification**.
5. Select a **Grid profile** that is applicable for your region.
6. Make note of the Envoy serial number and the authorization number on the screen. You will need this information in the following steps.
7. Click the link to the Enlighten website. (If you do not already have an account, click **Enlighten Login** at the Enlighten website to register.) Note that this link will not appear if the Envoy shows “-Web”.

NOTE: If the Envoy displays “-Web”, see “Local Area Networking Troubleshooting” on page 30.

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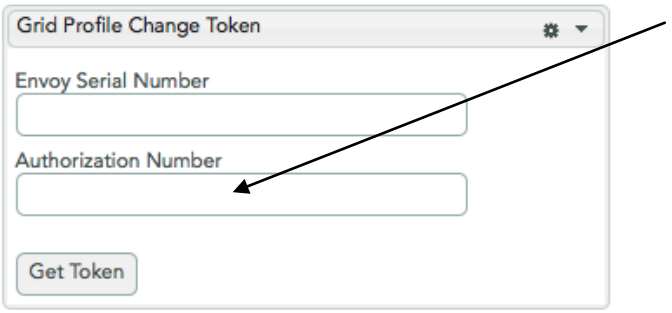
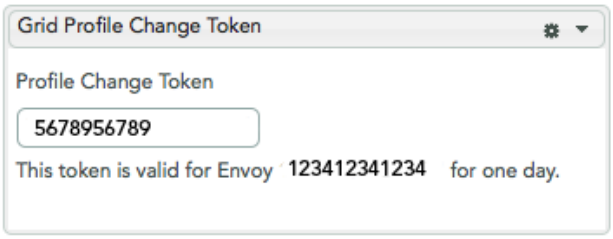
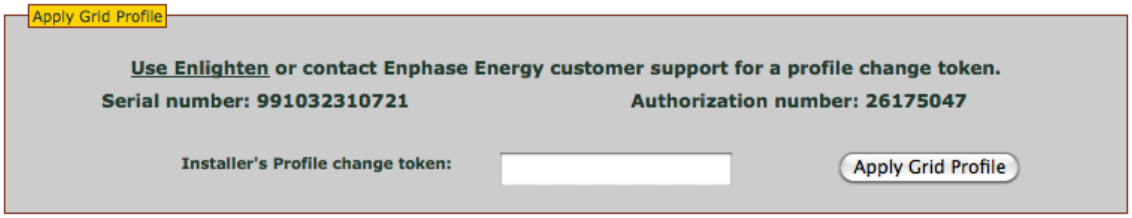
8. Once logged in at the Enlighten website, locate the Grid Profile Change Token widget. If you don't see this widget add it now:
   - Click **Add a widget**.
   - Select **Grid Profile Change Token.**
9. Enter the Envoy serial number.



10. Enter the authorization number from the Envoy Interface.
11. Click **Get Token**.



12. Copy the token.
13. Paste or enter the token in the Grid Profile screen.


Apply Grid Profile
Use Enlighten or contact Enphase Energy customer support for a profile change token.
Serial number: 991032310721
Authorization number: 26175047
Installer's Profile change token:
Apply Grid Profile

14. Click **Apply Grid Profile**.
    This propagates the settings to the microinverters.

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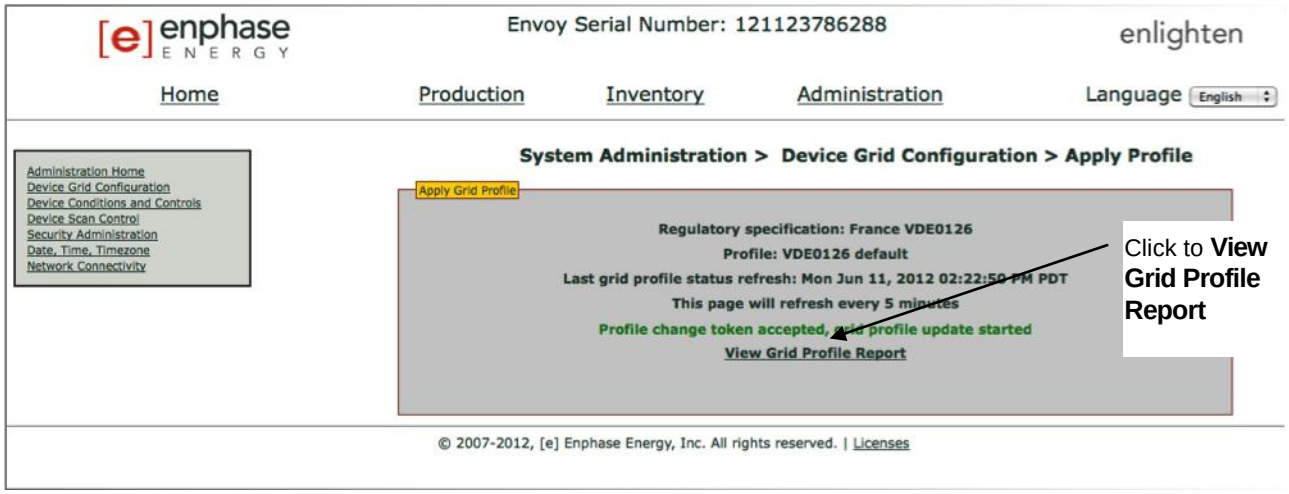
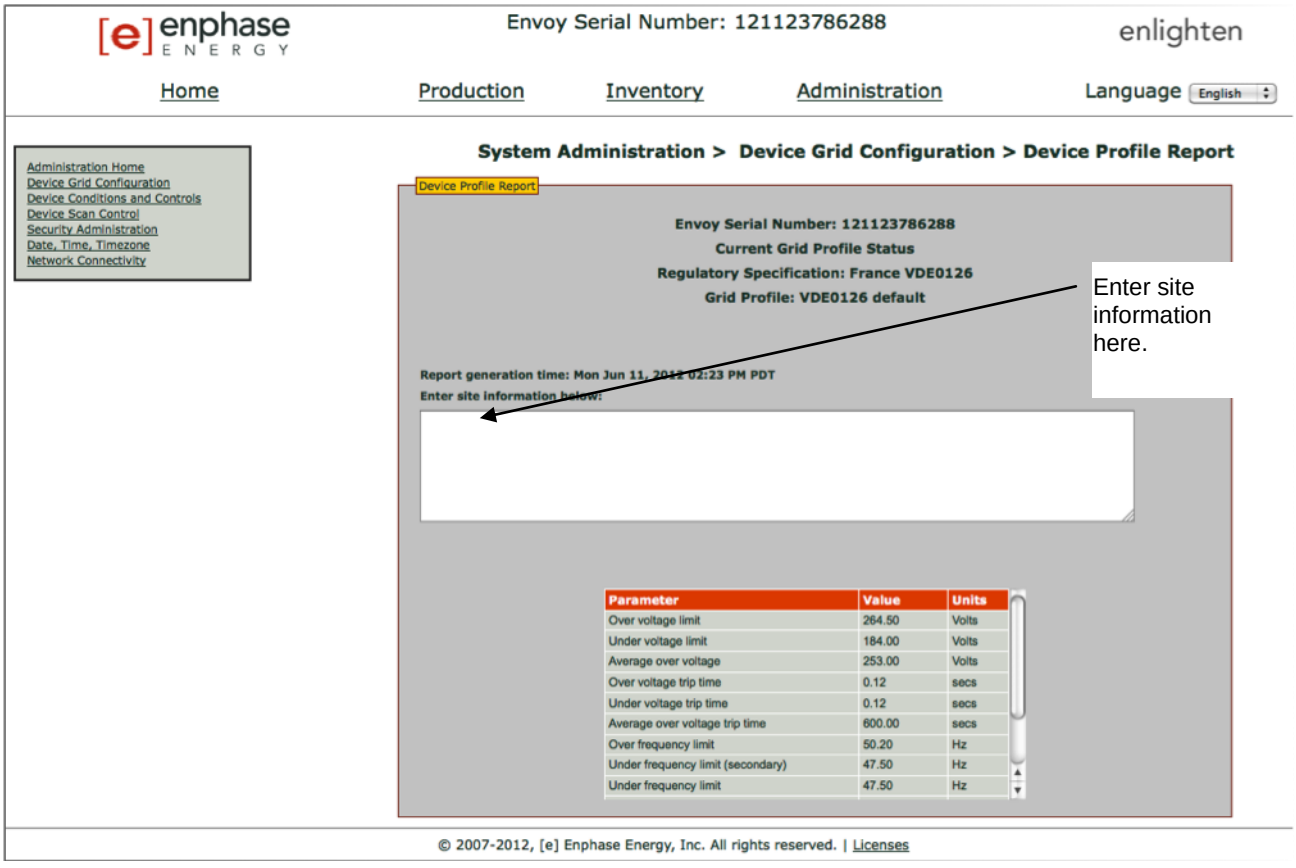
The Apply Profile screen appears. This screen allows you to generate a report to confirm that the microinverters have been set with an updated grid profile.

15. Click **View Device Profile Report**.



The Device Profile Report screen appears

16. Enter the site information in the window provided.



17. Use your browser to send this report to your printer or to save it to a file. After printing or saving the file, you can send it to the local regulatory agency to verify the trip point settings.

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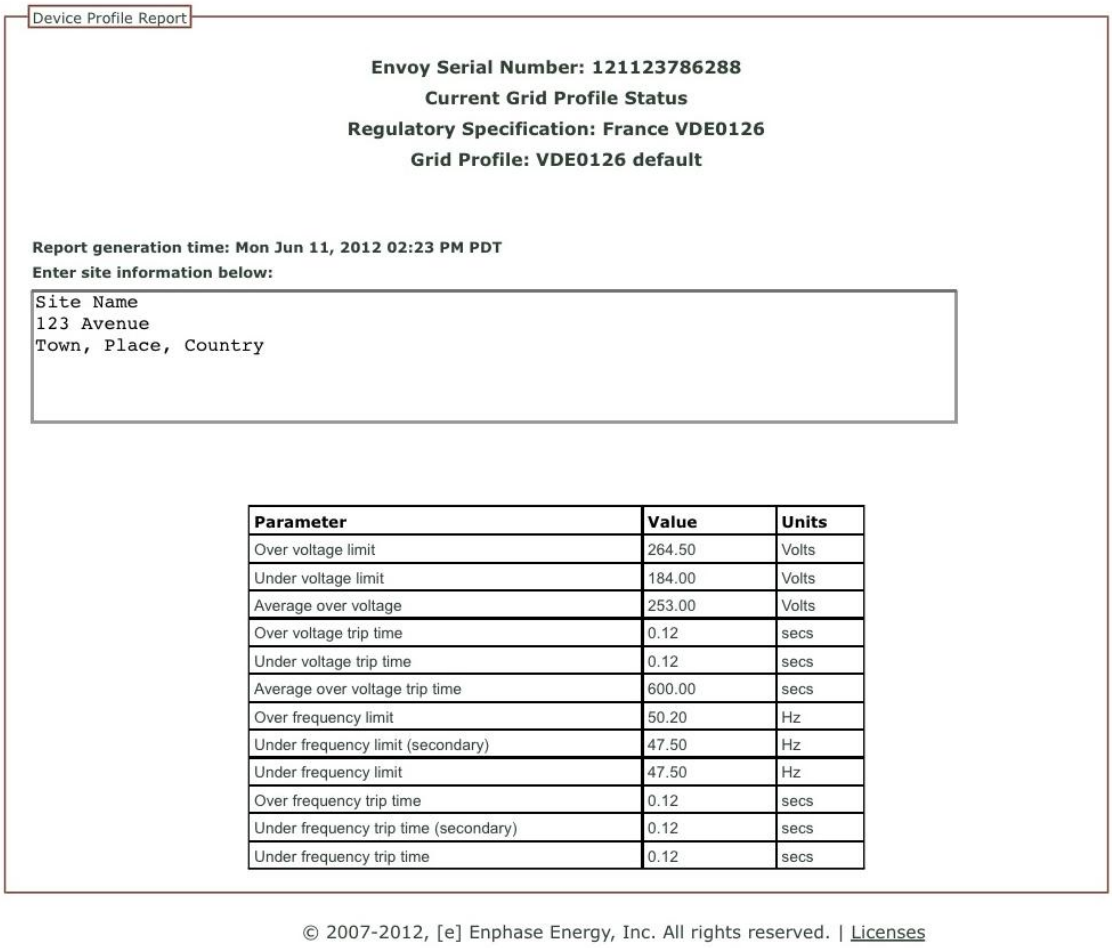
The report will look like the following example.



Device Profile Report

Envoy Serial Number: 121123786288
Current Grid Profile Status
Regulatory Specification: France VDE0126
Grid Profile: VDE0126 default

Report generation time: Mon Jun 11, 2012 02:23 PM PDT
Enter site information below:

Site Name
123 Avenue
Town, Place, Country

Parameter	Value	Units
Over voltage limit	264.50	Volts
Under voltage limit	184.00	Volts
Average over voltage	253.00	Volts
Over voltage trip time	0.12	secs
Under voltage trip time	0.12	secs
Average over voltage trip time	600.00	secs
Over frequency limit	50.20	Hz
Under frequency limit (secondary)	47.50	Hz
Under frequency limit	47.50	Hz
Over frequency trip time	0.12	secs
Under frequency trip time (secondary)	0.12	secs
Under frequency trip time	0.12	secs

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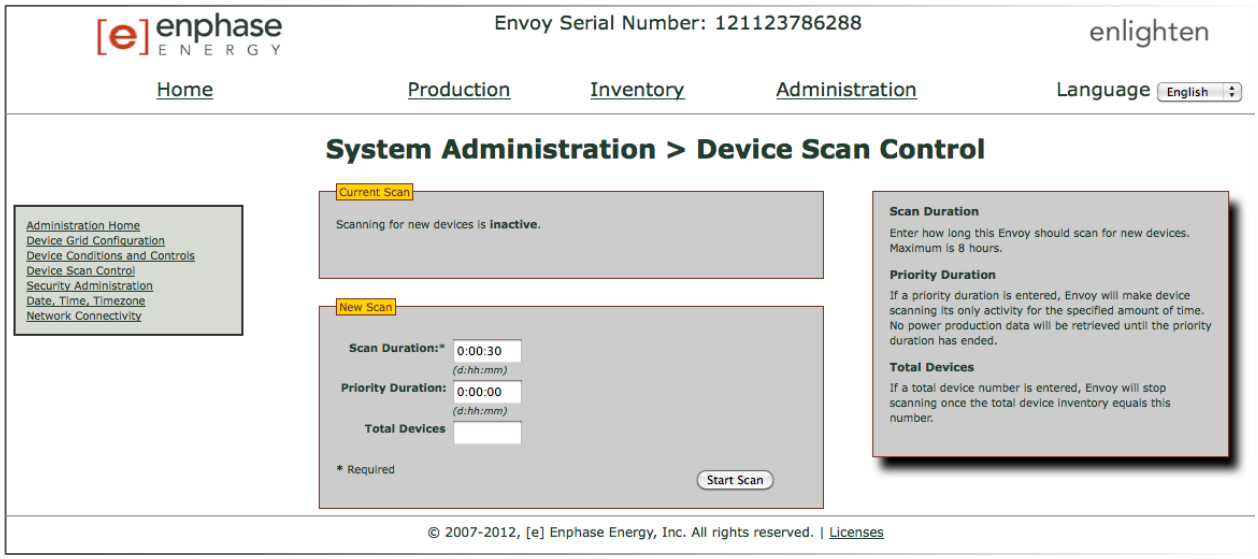
Set Up Device Scan Control

The “controlled” device scan differs from other Envoy device scans in that it allows control over scan period, scanning method, and number of devices. When first installed, the Envoy initiates an eight-hour scan. This initial scan is the only scan needed for most systems.

NOTE: At sites with more than 100 microinverters, we recommend using the controlled device scan presented here and specifying the total number of devices to be discovered. This will speed up the discovery process.

To run a controlled device scan to detect new or previously undetected microinverters:

1. From the Admin menu, choose **Device Scan Control**.
   The Device Scan Control screen appears.


[e] enphase ENERGY
Envoy Serial Number: 121123786288
enlighten
Home
Production
Inventory
Administration
Language English
System Administration > Device Scan Control
Administration Home
Device Grid Configuration
Device Conditions and Controls
Device Scan Control
Security Administration
Date, Time, Timezone
Network Connectivity
Current Scan
Scanning for new devices is inactive.
New Scan
Scan Duration:* 0:00:30
(d:hh:mm)
Priority Duration: 0:00:00
(d:hh:mm)
Total Devices
* Required
Start Scan
Scan Duration
Enter how long this Envoy should scan for new devices. Maximum is 8 hours.
Priority Duration
If a priority duration is entered, Envoy will make device scanning its only activity for the specified amount of time. No power production data will be retrieved until the priority duration has ended.
Total Devices
If a total device number is entered, Envoy will stop scanning once the total device inventory equals this number.
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2. Enter a **Scan Duration** in days:hours:minutes (e.g., 0:00:60 to indicate zero days, zero hours, and 60 minutes). The scan duration will depend on many factors, such as number of devices to be detected and quality of power line communication. You may want to start with a one-hour scan and increase the duration as needed.

3. Although optional, it is **best practice** to enter a value for **Total Devices**. Enter a value in this field. **The Envoy will stop scanning once it has detected the given number of devices**.

NOTE: The Total Devices option can be used in conjunction with the Priority Duration option to help discover any last few microinverters.

4. Enter a **Priority Duration** (optional) in days:hours:minutes (e.g., 0:00:20 to indicate zero days, zero hours, and 20 minutes). If you enter a value in this field, the Envoy will make scanning its sole activity for the period specified.

NOTE: The Priority Duration option should only be used in limited situations, e.g., at large sites or sites experiencing problems discovering devices with the normal scan.

5. Click Start Scan to complete this task. The LCD screen will display the following, where “nnnn” represents the number of microinverters (devices) detected.

```
Priority Scan is
Active.  Devs: nnnn
```


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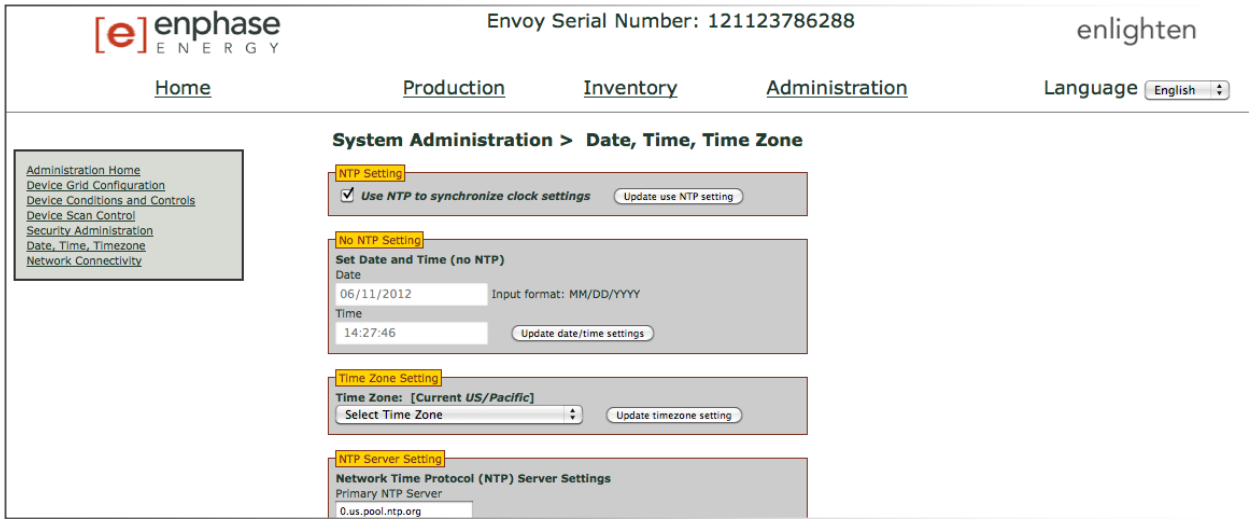
Set the Time Zone (optional)

Ordinarily, the Envoy obtains the time zone setting from Enlighten. If you do not have an Internet connection for the Envoy, you may want to set the local time zone. **This step is not necessary if the Envoy is reporting to Enlighten**. To set the time zone:

1. From the Admin menu, choose **Date, Time, Time Zone**.
2. Under **Time Zone Setting**, select a time zone from the **Select Time Zone** drop down menu.
3. Click **Update timezone setting** to complete this task.



Other Admin Tasks

Other Admin menu options not described in this manual are not required for normal system operation and should only be performed when recommended by Enphase.

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Event Messages

The following table lists messages that the Envoy can produce to indicate certain conditions. These messages appear on screen when your computer is connected to the Envoy local interface.

Where message is displayed:		Description
Home Screen	**Inventory Screen**	
AC Frequency Changing Too Fast	AC Frequency Changing Too Fast	**Recommended Action**: No action is required unless the condition persists. **Description**: AC frequency is the frequency at which voltage varies on the electricity network. The microinverter reports that this value is changing more rapidly than allowed. Frequency Changing Too Fast events are usually transient and self-correcting by the electricity network.
AC Frequency Out Of Range	AC Frequency Out Of Range	**Recommended Action:** This condition should correct itself. No action is required. **Description**: The microinverter reports that the frequency coming from the electricity network is either too low or too high as specified by applicable regional standards. AC frequency is the frequency at which voltage varies on the electricity network. Frequency Out of Range events are usually transient and self-correcting by the electricity network. When the microinverter detects an out of frequency condition, it must remain offline until the electricity network has been within acceptable limits continuously for a short period of time (seconds to minutes, varies by region). If, during that time, the utility again exceeds or falls short of acceptable limits, the timer must restart and the microinverter may not begin producing power for an additional short period following the last out-of-bounds condition. **If the condition persists**: Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
ACMonitorError	ACMonitorError	**Recommended Action**: No action is required unless the condition persists. **Description**: The microinverter is temporarily unable perform power conversion. **If the condition repeats or persists**: Contact your installer to arrange for the installation of a replacement microinverter.
AC Voltage Average High	AC Voltage Average High	**Recommended Action**: No action is required unless the condition persists. **Description**: The microinverter reports that the average AC voltage coming from the utility over the past 10 minutes was too high for the configured grid profile. **If the condition persists**: Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.

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Where message is displayed:		Description
Home Screen	**Inventory Screen**	
AC Voltage Out Of Range	AC Voltage Out Of Range	**Recommended Action:** This condition should correct itself. No action is required. **Description**: The microinverter reports that the AC voltage coming from the utility is either too low or too high as specified by applicable regional standards. When a microinverter detects the voltage out of range condition, it does not produce power (per regulation) until the utility voltage returns within acceptable limits for several minutes (time varies by region). If during that time the utility voltage again goes beyond acceptable limits, the timer restarts. **If the condition persists:** Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
Applying grid profile xx from regulatory specification yy		**Description:** The Envoy has started a change to the grid profile for the microinverters. This process may take a few minutes. No action is required. xx = grid profile name yy = Regional specification name.
Bad Flash Image	Bad Flash Image	**Description:** The microinverter is not producing power due to a software problem. **Recommended Action:** Contact Enphase Energy customer support.
Commanded Reset	Commanded Reset	**Recommended Action:** No action is required; it will automatically resume normal operation momentarily. **Description:** The microinverter was reset, either following a successful software download or by user command.
Control Request		**Recommended Action:** No action is required. **Description:** The Envoy has received a control request made via the Envoy interface (Administration > Device Conditions and Controls page) or via Enlighten. This uncommon condition will occur only during isolated troubleshooting procedures by Enphase personnel.
Critical Temperature	Critical Temperature	**Recommended Action:** This condition should correct itself. No action is required. **Description:** This rare condition occurs if the microinverter reports an internal temperature that exceeds its rated range. It reacts by producing less power to reduce internal temperature. Once the internal temperature of the microinverter is once again within normal limits, it will resume full power production and this error message will clear. **If the condition persists:** Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
DC Resistance Low	DC Resistance Low	**Recommended Action:** No action is required unless the condition persists. **Description:** A sensor in the microinverter measures the resistance between the positive and negative PV inputs to ground. If either resistance drops below a threshold, the microinverter raises this condition. This may indicate issues due to moisture, overload, defective circuit, live wires making contact with ground wire, or other conditions. **If the condition persists:** Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.

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Where message is displayed:		Description
Home Screen	**Inventory Screen**	
DC Voltage Too High	DC Voltage Too High	**Recommended Action:** Ask your installer to check that the PV module and microinverter are compatible. It may be that the PV module generates a higher voltage than is recommended for the microinverter. Your installer may refer to the Module Compatibility List for more information at http://www.enphase.com/downloads/. **Description:** The microinverter reports that DC input voltage from the PV module is too high. **If the condition persists:** If the PV module is compatible and the condition persists, contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
DC Voltage Too Low	DC Voltage Too Low	**Recommended Action:** This is usually a normal condition during hours of low light and at dawn and dusk. **Description:** The microinverter reports that DC input voltage from the PV module is too low. If this condition does not clear during hours of full daylight, the microinverters may be heavily shaded or covered by snow. **If the condition persists**: If this event occurs during full daylight or if the condition persists, contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/. If this event occurs and clears daily or often during hours of full daylight, check that the PV module and microinverter are compatible. Refer to the Module Compatibility List for more information at http://www.enphase.com/downloads/.
Download to module begun		**Description:** The Envoy has started a software upgrade to the indicated microinverter. **Recommended Action:** This process may take a few minutes. No action is required.
Download to module ended		**Description:** The Envoy has successfully delivered a software upgrade to a microinverter. **Recommended Action:** No action is required.
Download to module failed		**Description:** The Envoy was unable to successfully deliver a software upgrade to a microinverter. **Recommended Action:** No action is required; the Envoy will repeat the attempt.
Envoy Failure		**Recommended Action:** Unplug the Envoy from the AC outlet and plug it in once again. Leave it plugged in and in place for at least 15 minutes. **Description:** This message displays after the Envoy has tried unsuccessfully three times to start up. This condition does not affect your system's ability to produce power. When the connection is restored, the Envoy will catch up with the transmission of any/all energy data it has stored. **If the condition persists**: If the Envoy continues to display Gateway (or Envoy) Failure or if it never moves beyond the Initialization stage, contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
Filesystem integrity audit failed		**Description:** The Envoy file system integrity audit has failed. **Recommended Action:** For assistance, contact Enphase Energy customer support.

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Where message is displayed:		Description
Home Screen	**Inventory Screen**	
GridProfile-Incompatible	GridProfile-Incompatible	**Recommended Action:** Ask your installer to use the Envoy Interface to select a grid profile that is compatible with the installed microinverters. **Description:** This message displays when the selected grid profile is incompatible with microinverter hardware. This condition does not affect your system's ability to produce power, and when the connection is restored, the Envoy will catch up with the transmission of any/all energy data it has stored. **If the condition persists**: Contact your installer or refer to "Change or View the Grid Profile" on page 36.
Grid Gone	Grid Gone	**Recommended Action:** In most cases no action is required. If there is a power outage in your area and the system has stopped production. Solar production will resume when the utility restores power to your area. Verify that the circuit breaker(s) for the PV array are ON at the AC mains. If all breaker(s) are on, the condition should clear itself. **Description:** The microinverter detects no power coming from the local utility. Enphase microinverters are "utility interactive" and require a connection to the utility. **If the condition persists**: If Grid Gone events persist, contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
Grid Instability	Grid Instability	**Description:** The microinverter is not producing power due to one or more of these conditions: AC Frequency Out Of Range, AC Voltage Out Of Range, or Grid Gone. Note that Grid Instability will remain for about five minutes after the underlying conditions clear. No power is produced during this time. **Recommended Action:** No action is required unless the condition persists. If it persists, contact Enphase Energy customer support.
Grid Offset Hi	Grid Offset Hi	**Recommended Action:** No action is required unless the condition persists. **Description:** The average current to the grid is too high for the configured grid profile. When the microinverter is operating normally, no DC current is injected into the grid. If the DC current is too high, this may indicate an issue with the microinverter. **If the condition persists:** Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
Grid Offset Low	Grid Offset Low	**Recommended Action:** No action is required unless the condition persists. **Description:** The average current to the grid is too low for the configured grid profile. When the microinverter is operating normally, no DC current is injected into the grid. If the DC current is too low (negative), this may indicate an issue with the microinverter. **If the condition persists:** Contact your installer or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
Grid profile application completed		**Description:** The Envoy has completed a change to the grid profile for the microinverters. No action is required.
HardwareError	HardwareError	**Recommended Action:** Contact your installer to arrange for the installation of a replacement microinverter. **Description**: A hardware failure has occurred that prevents power conversion.

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Where message is displayed:		Description
Home Screen	**Inventory Screen**	
Module added		**Description:** The Envoy has detected and is now associated to a new microinverter. No action is required.
Microinverter failed to report	Failed to report	**Recommended Action:** You can ignore occasional instances of this error. Communications will likely recover on the next reporting cycle. If communications do not recover immediately, make sure that the Envoy is plugged in very near to the AC mains. Also, if other devices are sharing the outlet with the Envoy, remove those devices from the outlet to improve communication signal strength. If the Enphase Envoy was recently relocated or if new devices or appliances were added to the circuit, it is possible that the new situation is not suitable for power line communication. The Envoy may need to be relocated to improve signal strength and reduce interfering noise on the power lines. To determine the quality of the Envoy's location for communication, please run a Communications check by holding down the Envoy's menu button until the LCD display reads "Enable Communication Check" and then release the menu button. The Envoy will then broadcast a signal to the microinverters. Within 5 minutes, a "Comm Level" indication of 0 to 5 bars will display on the Envoy LCD display. The Envoy requires a minimum of 3 bars to communicate effectively with the microinverters. **Description:** The Envoy reporting this condition is unable to communicate with the microinverters over the power lines. **If the condition persists**: See "Power Line Communication Troubleshooting" on page 29, or contact your installer, or refer to the Troubleshooting Guide at http://www.enphase.com/downloads/.
Microinverter grid configuration failed after 5 attempts, retrying		**Description:** The attempt to change the grid profile for the microinverters has failed after five tries. The Envoy will continue to attempt to change the grid profile. **Recommended Action:** No action is required.
Microinverter grid configuration failure cleared after xx attempts		**Description:** A failed attempt to change the grid profile for the microinverters has cleared. The grid profile was successfully applied. xx = number of attempts **Recommended Action:** No action is required.
Module Sleeping	Sleeping	**Description:** The microinverter is off for the night. **Recommended Action:** No action is required.
No Grid Profile	No Grid Profile	**Recommended Action:** Ask the installer to use the Envoy Gateway interface to select a grid profile for this system. For more information, refer to "Manage Grid Profile" on page 36 **Description:** The Envoy has not been set up with a grid profile for the microinverters.
Over Temperature	Over Temperature	**Description:** The microinverter is too hot and is not producing power. This very rare condition usually clears without intervention. **Recommended Action:** No action is required unless the condition persists. If it persists, contact Enphase Energy customer support.
Power generation off by command	Power generation off by command	**Description:** The microinverter is not producing power by user command. This uncommon condition will occur only during isolated troubleshooting procedures by Enphase personnel. **Recommended Action:** No action is required.

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Where message is displayed:		Description
Home Screen	**Inventory Screen**	
Power On Reset	Power On Reset	**Description:** The microinverter has powered on after having both AC and DC disconnected. **Recommended Action:** No action is required.
Shutdown		**Description:** The Envoy has been powered down (unplugged from AC power). **Recommended Action:** Restore AC power to the Envoy.
Startup		**Description:** The Envoy has been powered back up (plugged back in to AC power). **Recommended Action:** No action is required.
Transient Grid Profile	Transient Grid Profile	**Recommended Action:** No action is required. This condition will clear once the grid profile test is complete. **Description:** This system is currently in test mode.

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Technical Data

Communications Interface	
Power line	Enphase proprietary
Ethernet	10/100 auto-sensing, auto-negotiation
USB (two ports)	USB 2.0 interface, auto-sensing, auto-negotiation
Monitoring capacity	Model number (SKU) ENV-230 monitors up to 500 Enphase Microinverters.
Power Requirements	
AC outlet	230VAC, 50Hz
Power consumption	2.5 watts typical, 7 watts maximum
Mechanical Data	
Dimensions (WxHxD)	222.5 mm x 112mm x 43.2mm
Weight	340g
Ambient temperature range	-40˚C to +65˚C
Cooling	Natural convection – no fans
Enclosure environmental rating	Indoor
Features	
Standard warranty term	1 year
Compliance	EN 60950-1, EN 55022 Class B, EN 55024, EN 50065-1, EN 50065-2-2, EN 61000-3-2, EN 61000-3-3
Meter accuracy	Envoy metering is qualified as +/- 5% or better.

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